

**APPENDIX E – SEDIMENT QUALITY DATA**

# **Evaluation of Potomac River Sediments**

**December 1996**

**Submitted for:  
U.S. Army Corps of Engineers, Baltimore District  
Navigation Branch**

**Submitted by:  
CH2M HILL  
Delivery Order #9  
Contract No. DACW31-95-D-0045**

A total of 17 individual and composite samples were processed and shipped to Chemtech for analysis.

**Table 1**  
**Maryland State Plane (NAD 83) Coordinates and Depth**  
**of Potomac River Sediment Samples**

| EASTING    | NORTHING  | Sample # | Water Depth (ft.) |
|------------|-----------|----------|-------------------|
| 1288867    | 375099    | GS-1     | 26.3              |
| 1284340    | 373818    | GS-2     | 27.9              |
| 1252526    | 334822    | CS-3     | 23.9              |
| 1249134    | 330621    | CS-4     | 22.7              |
| 1246623    | 327505    | CS-5     | 23.8              |
| 1233902.82 | 310216.87 | CS-6     | 28.6              |
| 1232861.39 | 306929.05 | CS-7     | 26.9              |
| 1233035.98 | 303739.6  | CS-8     | 25.5              |
| 1234412.27 | 286919.17 | CS-9     | 25.8              |
| 1234852.08 | 277691.3  | CS-10    | 24.5              |
| 1234974.38 | 276094.76 | CS-11    | 24.5              |
| 1235513.88 | 268514.6  | CS-12    | 25.4              |
| 1236533.39 | 266142.08 | CS-13    | 22.8              |
| 1281415.59 | 264791.55 | CS-20    | 23.9              |
| 1279916.89 | 264370.21 | CS-19    | 23                |
| 1237384.75 | 264333.28 | CS-14    | 22.1              |
| 1278528.87 | 263980.49 | CS-18    | 23.5              |
| 1239183.09 | 260534.8  | CS-15    | 24.9              |
| 1240732.29 | 257234.25 | CS-16    | 21.6              |
| 1243288.10 | 253639.08 | CS-17    | 25                |
| 1340151.83 | 214377.76 | GS-22    | 25.4              |
| 1347748.39 | 210867.23 | GS-21    | 25.3              |

Note: Coordinates were supplied by Corps personnel using GPS. CS=Core sample, GS=Grab sample

Composite samples were created by mixing the sediment samples in a stainless steel bowl. Samples to be analyzed for volatile organic compounds (VOAs) were not mixed but layered carefully in the collection jar to reduce volatilization. The stainless steel bowl and spoon were steam-cleaned initially, and decontaminated after each sample collected. The bowl and spoon were scrubbed with a solution of trisodium phosphate (TSP) and a scrub-brush and then rinsed with distilled water. The equipment received a final rinse with methanol and then was air-dried and wrapped in aluminum foil to prevent contamination from ambient air.

The core sampler was steam-cleaned, by Baltimore District personnel, before each sample was collected.







Potomac River Sediments Lab Analysis

|                        | g0102  | cs0306 | cs04  | cs0508 | cs07 | cs0911 | cs10  | cs12  | cs13  | cs1415 | cs16  | cs17 (Est.) | cs1817 | cs19 (Est.) | cs1820 | cs1920A | gs2122 |
|------------------------|--------|--------|-------|--------|------|--------|-------|-------|-------|--------|-------|-------------|--------|-------------|--------|---------|--------|
| <b>Grain Size</b>      |        |        |       |        |      |        |       |       |       |        |       |             |        |             |        |         |        |
| Insufficient           |        |        |       |        |      |        |       |       |       |        |       |             |        |             |        |         |        |
| > 2.0 mm               | Volume | 66.72  | 48.43 | 34.4   | 36   | 19.82  | 16.74 | 19.75 | 51.59 | 50.64  | 40.23 | 22.69       | 31.03  | 36.63       | 52.07  | 51.01   | 11.87  |
| > 0.85 mm to 2.0 mm    |        |        |       |        |      |        |       |       |       |        |       |             |        |             |        |         |        |
| > 0.425 mm to 0.85 mm  |        |        |       |        |      |        |       |       |       |        |       |             |        |             |        |         |        |
| > 0.25 mm to 0.425 mm  |        |        |       |        |      |        |       |       |       |        |       |             |        |             |        |         |        |
| > 0.15 mm to 0.25 mm   |        |        |       |        |      |        |       |       |       |        |       |             |        |             |        |         |        |
| > 0.075 mm to 0.15 mm  |        |        |       |        |      |        |       |       |       |        |       |             |        |             |        |         |        |
| > 0.038 mm to 0.075 mm |        |        |       |        |      |        |       |       |       |        |       |             |        |             |        |         |        |
| > 0.038 mm             |        |        |       |        |      |        |       |       |       |        |       |             |        |             |        |         |        |

NOTE: The composition of samples CS17 and CS19 were estimated using composite results from CS1617 and CS1820, respectively.

**McCALLUM TESTING LABORATORIES, INC.**

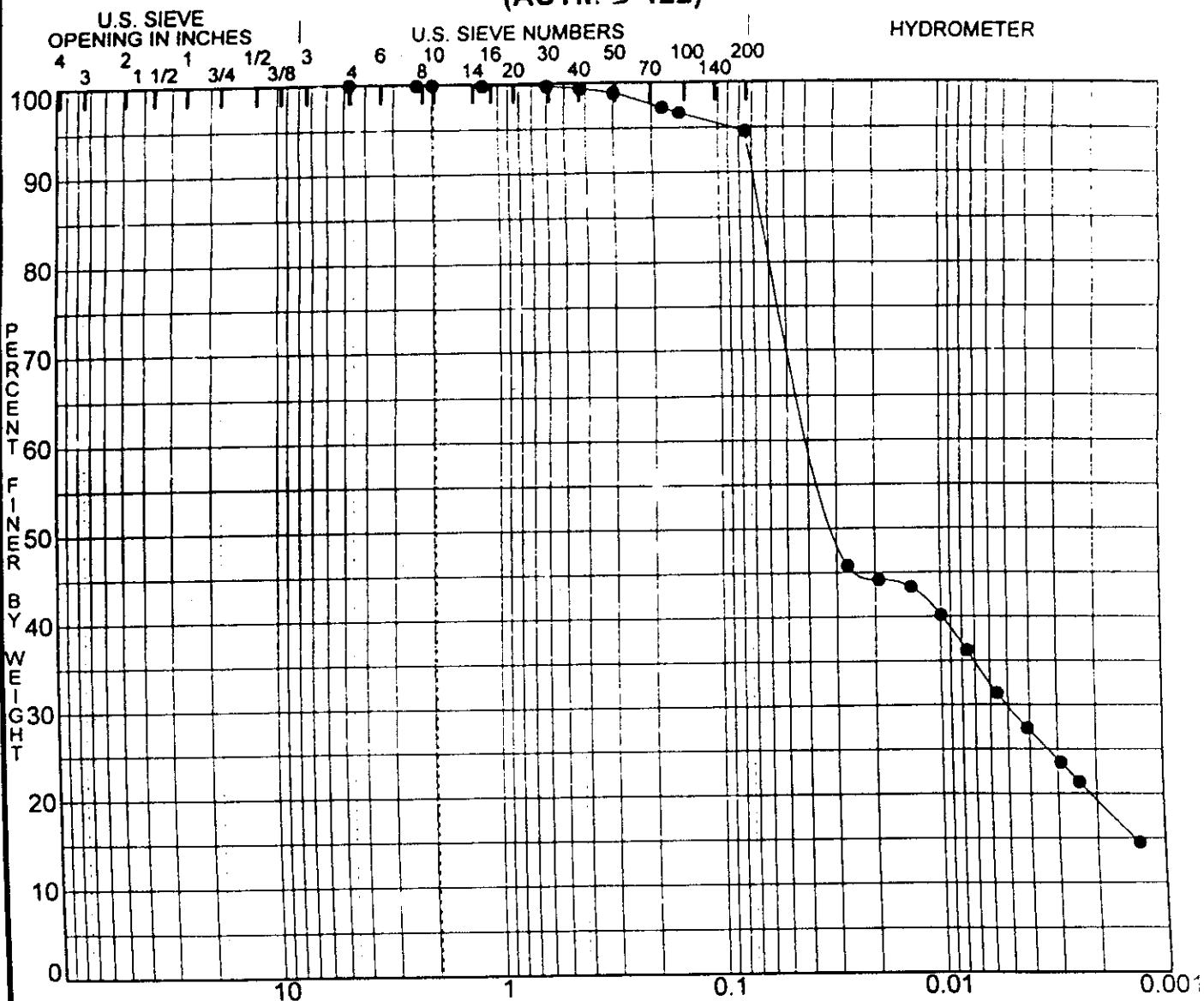
**SEDIMENT MATERIAL ANALYSIS**  
**JOB #99-030.014**  
**MATTAWOMAN CREEK, MARYLAND**  
**MTL PROJECT 99-7275**

| <b>PARTICLE SIZE ANALYSIS OF SOILS TEST RESULTS (ASTM D 422)</b> |                                 |             |             |
|--|---------------------------------|-------------|-------------|
| <b>SIEVE<br/>SIZES</b>   | <b>SAMPLE IDENTIFICATION</b>    |             |             |
|  | <b>SAMPLES RECEIVED 4/16/99</b> |             |             |
|  | <b>GS-1</b>                     | <b>GS-2</b> | <b>GS-3</b> |
| <b>PERCENT PASSING</b>   |                                 |             |             |
| #4 (4.75 mm)   | 100                             | ---         | ---         |
| #8 (2.36 mm)   | 99.9                            | ---         | ---         |
| #10 (2.00 mm)  | 99.9                            | ---         | 100         |
| #16 (1.18 mm)  | 99.8                            | ---         | 99.9        |
| #30 (0.600 mm)   | 99.7                            | 100         | 99.3        |
| #40 (0.425 mm)   | 99.4                            | 99.9        | 92.3        |
| #50 (0.300 mm)   | 98.9                            | 99.9        | 76.5        |
| #80 (0.180 mm)   | 97.3                            | 99.7        | 39.4        |
| #100 (0.150 mm)  | 96.7                            | 99.6        | 25.3        |
| #200 (0.075 mm)  | 94.6                            | 99.1        | 11.9        |
| <b>HYDROMETER TEST</b>   |                                 |             |             |
| % SILT (0.075 – 0.005 mm)  | 64.7                            | 60.4        | 7.6         |
| % CLAY (< 0.005 mm)  | 29.9                            | 38.7        | 4.3         |
| <b>SPECIFIC GRAVITY OF SOILS TEST RESULTS (ASTM D 854)</b>       |                                 |             |             |
| <b>SPECIFIC GRAVITY</b>  | 2.62                            | 2.62        | 2.65        |

# McCallum Testing Laboratories, Inc.

1808 Hayward Avenue, Chesapeake, VA 23320

## PARTICLE SIZE ANALYSIS (ASTM D 422)



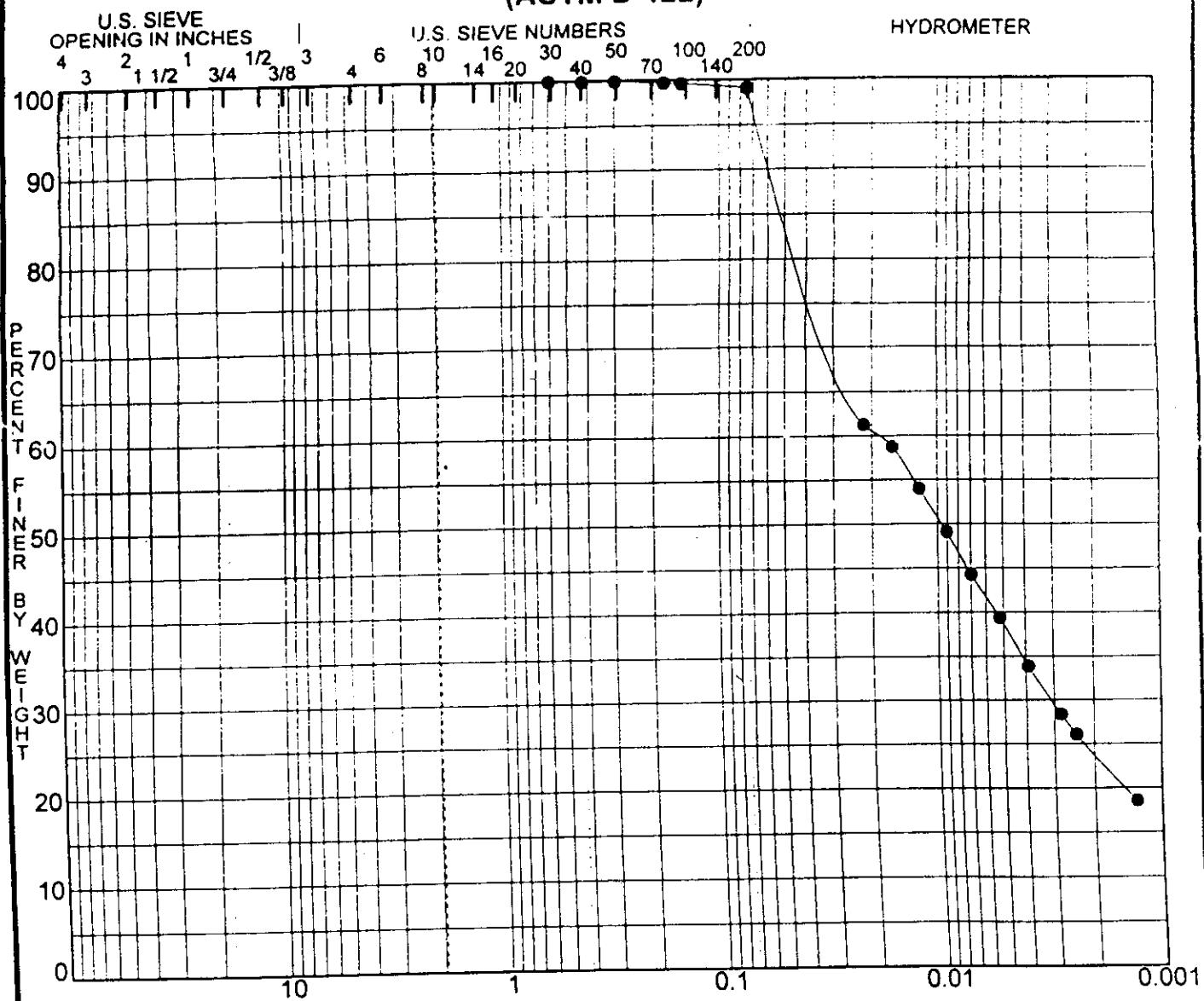
| GRAVEL |      | SAND   |        |      | SILT OR CLAY |  |  |
|--------|------|--------|--------|------|--------------|--|--|
| coarse | fine | coarse | medium | fine |              |  |  |

| Specimen Identification | Classification  |      |       |     | MC%     | LL    | PL    | PI    | Cc | Cu |
|-------------------------|---|------|-------|-----|---------|-------|-------|-------|----|----|
| ● GS-1                  | Dark brown, clayey silt with traces of fine sand, CL-ML |      |       |     | ----    | ----  | ----  | ----  |    |    |
| Specimen Identification | D100  | D60  | D30   | D10 | %Gravel | %Sand | %Silt | %Clay |    |    |
| ● GS-1                  | 4.75  | 0.04 | 0.005 |     | 0.0     | 5.4   | 64.7  | 29.9  |    |    |

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## PARTICLE SIZE ANALYSIS (ASTM D 422)



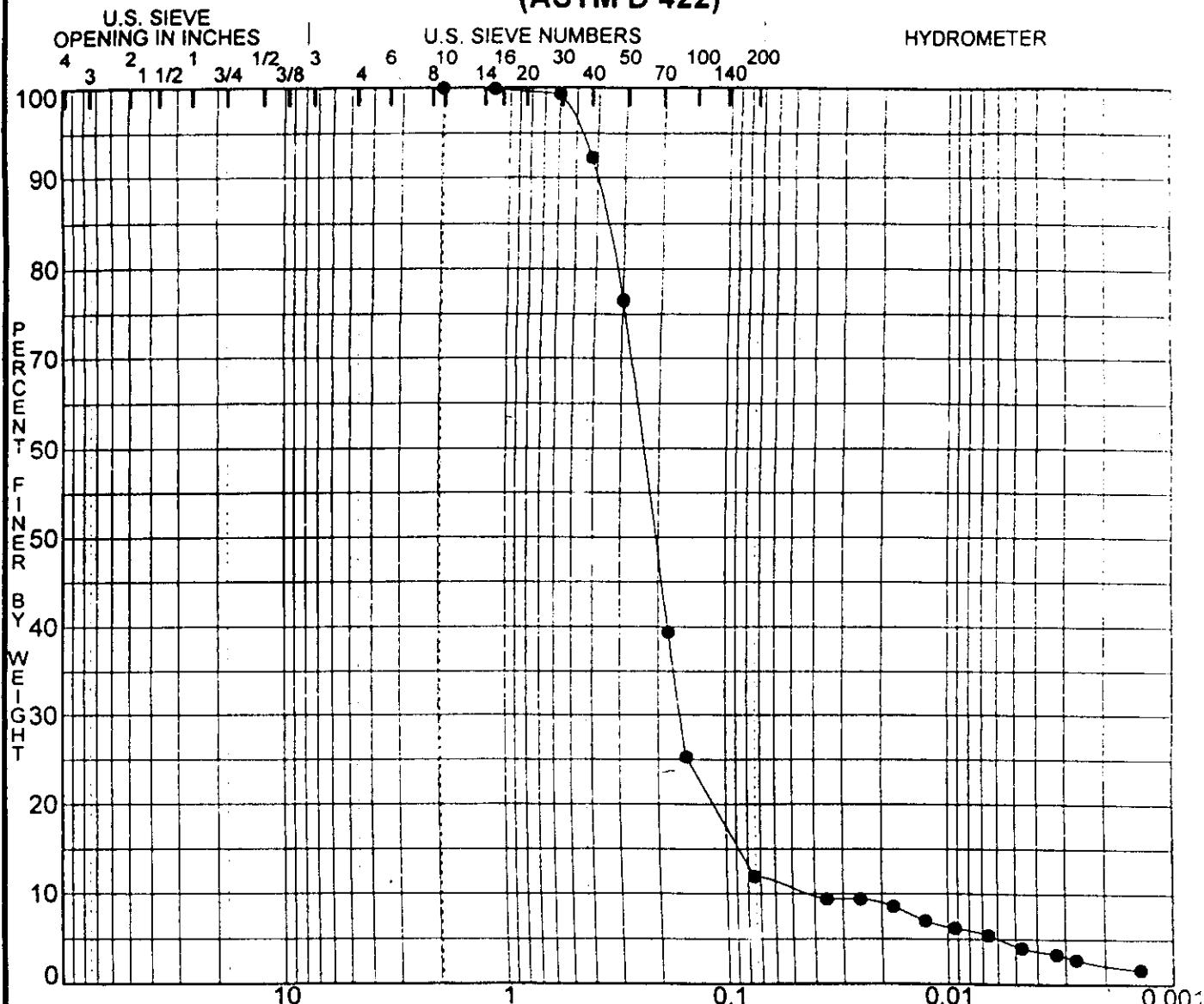
| GRAVEL |      | SAND   |        |      | SILT OR CLAY |  |  |
|--------|------|--------|--------|------|--------------|--|--|
| coarse | fine | coarse | medium | fine |              |  |  |

| Specimen Identification | Classification  |      |       |     | MC%     | LL    | PL    | PI    | Cc | Cu |
|-------------------------|---|------|-------|-----|---------|-------|-------|-------|----|----|
| ● GS-2                  | Dark brown, clayey silt with traces of fine sand, CL-ML |      |       |     | ---     | ---   | ---   | ---   |    |    |
| Specimen Identification | D100  | D60  | D30   | D10 | %Gravel | %Sand | %Silt | %Clay |    |    |
| ● GS-2                  | 0.60  | 0.02 | 0.003 |     | 0.0     | 0.9   | 60.4  | 38.7  |    |    |

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## PARTICLE SIZE ANALYSIS (ASTM D 422)



| GRAVEL |      | SAND   |        |      | SILT OR CLAY |  |  |  |
|--------|------|--------|--------|------|--------------|--|--|--|
| coarse | fine | coarse | medium | fine |              |  |  |  |

| Specimen Identification | Classification  |  |  |  | MC% | LL  | PL  | PI  | Cc   | Cu  |
|-------------------------|---|--|--|--|-----|-----|-----|-----|------|-----|
| ● GS-3                  | Dark brown, silty fine to medium sand<br>with traces of clay, SP-SM |  |  |  | --- | --- | --- | --- | 2.50 | 5.6 |

| Specimen Identification | D100 | D60  | D30   | D10    | %Gravel | %Sand | %Silt | %Clay |
|-------------------------|------|------|-------|--------|---------|-------|-------|-------|
| ● GS-3                  | 2.00 | 0.24 | 0.159 | 0.0425 | 0.0     | 88.1  | 7.6   | 4.3   |

GPL LABORATORIES, LLLP  
ORGANIC ANALYSIS RESULTS

GP ID: 9905045-01C  
Client ID: MWB-3  
Collected: 05/06/99  
Dilution: 1

Matrix: WATER  
Method: SW-846 8082  
Units: ug/L

Analyst: ALE  
Analyzed: 05/14/99  
Prepared: 05/11/99

## GC TARGET COMPOUNDS

| Parameter                        | Result | Rep.Lim. | Qualifier |
|----------------------------------|--------|----------|-----------|
| 2,2',3,5'-Tetrachlorobiphenyl    | BQL    | 0.051    |           |
| 2,2',5,5'-Tetrachlorobiphenyl    | BQL    | 0.051    |           |
| 2,2',5-Trichlorobiphenyl         | BQL    | 0.051    |           |
| 2,2'3,4,4'-5-Hexachlorobiphenyl  | BQL    | 0.051    |           |
| 2,2'3,4,5'-Pentachlorobiphenyl   | BQL    | 0.051    |           |
| 2,2'3,4,5,5'-Hexachlorobiphenyl  | BQL    | 0.051    |           |
| 2,2'3,5,5'-6-Hexachlorobiphenyl  | BQL    | 0.051    |           |
| 2,2'4,4',5,5'-Hexachlorobiphenyl | BQL    | 0.051    |           |
| 2,2'4,5,5'-Pentachlorobiphenyl   | BQL    | 0.051    |           |
| 2,3',4,4'-Tetrachlorobiphenyl    | BQL    | 0.051    |           |
| 2,3,3',4'6-Pentachlorobiphenyl   | BQL    | 0.051    |           |
| 2,3-Dichlorobiphenyl             | BQL    | 0.051    |           |
| 2,4',5-Trichlorobiphenyl         | BQL    | 0.051    |           |
| 2-Chlorobiphenyl                 | BQL    | 0.051    |           |
| 22'33'44'5-Heptachlorobiphenyl   | BQL    | 0.051    |           |
| 22'33'44'55'6-Nonachlorobiphenyl | BQL    | 0.051    |           |
| 22'34'55'6-Heptachlorobiphenyl   | BQL    | 0.051    |           |
| 22'344'5'6-Heptachlorobiphenyl   | BQL    | 0.051    |           |
| 22'344'55'-Heptachlorobiphenyl   | BQL    | 0.051    |           |

GPL LABORATORIES, LLLP  
ORGANIC ANALYSIS RESULTS

GP ID: 9905045-02C  
Client ID: MWB-2  
Collected: 05/06/99  
Dilution: 1

Matrix: WATER  
Method: SW-846 8082  
Units: ug/L

Analyst: ALE  
Analyzed: 05/14/99  
Prepared: 05/11/99

## GC TARGET COMPOUNDS

| Parameter                       | Result | Rep.Lim. | Qualifier |
|---------------------------------|--------|----------|-----------|
| 2,2',3,5'-Tetrachlorobiphenyl   | BQL    | 0.051    |           |
| 2,2',5,5'-Tetrachlorobiphenyl   | BQL    | 0.051    |           |
| 2,2',5-Trichlorobiphenyl        | BQL    | 0.051    |           |
| 2,2'3,4,4'5-Hexachlorobiphenyl  | BQL    | 0.051    |           |
| 2,2'3,4,5'1-Pentachlorobiphenyl | BQL    | 0.051    |           |
| 2,2'3,4,5,5'Hexachlorobiphenyl  | BQL    | 0.051    |           |
| 2,2'3,5,5'6-Hexachlorobiphenyl  | BQL    | 0.051    |           |
| 2,2'4,4'5,5'Hexachlorobiphenyl  | BQL    | 0.051    |           |
| 2,2'4,5,5'1-Pentachlorobiphenyl | BQL    | 0.051    |           |
| 2,3',4,4'1-Tetrachlorobiphenyl  | BQL    | 0.051    |           |
| 2,3,3'4'6-Pentachlorobiphenyl   | BQL    | 0.051    |           |
| 2,3-Dichlorobiphenyl            | BQL    | 0.051    |           |
| 2,4',5-Trichlorobiphenyl        | BQL    | 0.051    |           |
| 2-Chlorobiphenyl                | BQL    | 0.051    |           |
| 22'33'44'5-Heptachlorobiphenyl  | BQL    | 0.051    |           |
| 22'33'44'55'6-Nonachlorobiphen  | BQL    | 0.051    |           |
| 22'34'55'6-Heptachlorobiphenyl  | BQL    | 0.051    |           |
| 22'344'5'6-Heptachlorobiphenyl  | BQL    | 0.051    |           |
| 22'344'55'1-Heptachlorobiphenyl | BQL    | 0.051    |           |

Project: 99-030 MATTAWOMAN CREEK

GPL LABORATORIES, LLLP  
ORGANIC ANALYSIS RESULTS

Page 4

GP ID: 9905045-03C  
Client ID: MWB-1  
Collected: 05/06/99  
Dilution: 1

Matrix: WATER  
Method: sw-846 8082  
Units: ug/L

Analyst: ALE  
Analyzed: 05/14/99  
Prepared: 05/11/99

GC TARGET COMPOUNDS

| Parameter                        | Result | Rep.Lim. | Qualifier |
|----------------------------------|--------|----------|-----------|
| 2,2',3,5'-Tetrachlorobiphenyl    | BQL    | 0.051    |           |
| 2,2',5,5'-Tetrachlorobiphenyl    | BQL    | 0.051    |           |
| 2,2',5-Trichlorobiphenyl         | BQL    | 0.051    |           |
| 2,2',3,4,4'5-Hexachlorobiphenyl  | BQL    | 0.051    |           |
| 2,2',3,4,5'-Pentachlorobiphenyl  | BQL    | 0.051    |           |
| 2,2',3,4,5,5'Hexachlorobiphenyl  | BQL    | 0.051    |           |
| 2,2',3,5,5'6-Hexachlorobiphenyl  | BQL    | 0.051    |           |
| 2,2',4,4'5,5'Hexachlorobiphenyl  | BQL    | 0.051    |           |
| 2,2',4,5,5'-Pentachlorobiphenyl  | BQL    | 0.051    |           |
| 2,3',4,4'-Tetrachlorobiphenyl    | BQL    | 0.051    |           |
| 2,3,3'4'6-Pentachlorobiphenyl    | BQL    | 0.051    |           |
| 2,3-Dichlorobiphenyl             | BQL    | 0.051    |           |
| 2,4',5-Trichlorobiphenyl         | BQL    | 0.051    |           |
| 2-Chlorobiphenyl                 | BQL    | 0.051    |           |
| 22'33'44'5-Heptachlorobiphenyl   | BQL    | 0.051    |           |
| 22'33'44'55'6-Nonachlorobiphenyl | BQL    | 0.051    |           |
| 22'34'55'6-Heptachlorobiphenyl   | BQL    | 0.051    |           |
| 22'344'5'6-Heptachlorobiphenyl   | BQL    | 0.051    |           |
| 22'344'55'-Heptachlorobiphenyl   | BQL    | 0.051    |           |

GPL LABORATORIES, LLLP  
METALS ANALYSIS RESULTS

GP ID: 9905045-01

Client ID: MWB-3

Matrix: WATER

Collected: 05/06/99

| Parameter | Method     | Result | Rep.Lim. | Units | Dil. | Prepared | Analyzed By  |
|-----------|------------|--------|----------|-------|------|----------|--------------|
| Mercury   | SW846 7470 | BQL    | 0.20     | UG/L  | 1    | 05/11/99 | 05/12/99 LCM |
| Arsenic   | SW846 6010 | BQL    | 5.0      | UG/L  | 1    | 05/13/99 | 05/14/99 DDH |
| Cadmium   | SW846 6010 | BQL    | 3.0      | UG/L  | 1    | 05/13/99 | 05/14/99 DDH |
| Chromium  | SW846 6010 | BQL    | 5.0      | UG/L  | 1    | 05/13/99 | 05/14/99 DDH |
| Copper    | SW846 6010 | BQL    | 5.0      | UG/L  | 1    | 05/13/99 | 05/14/99 DDH |
| Lead      | SW846 6010 | BQL    | 3.0      | UG/L  | 1    | 05/13/99 | 05/14/99 DDH |
| Zinc      | SW846 6010 | 11.1   | 5.0      | UG/L  | 1    | 05/13/99 | 05/14/99 DDH |

GP ID: 9905045-02

Client ID: MWB-2

Matrix: WATER

Collected: 05/06/99

| Parameter | Method     | Result | Rep.Lim. | Units | Dil. | Prepared | Analyzed By  |
|-----------|------------|--------|----------|-------|------|----------|--------------|
| Mercury   | SW846 7470 | BQL    | 0.20     | UG/L  | 1    | 05/11/99 | 05/12/99 LCM |
| Arsenic   | SW846 6010 | 8.2    | 5.0      | UG/L  | 1    | 05/13/99 | 05/14/99 DDH |
| Cadmium   | SW846 6010 | BQL    | 3.0      | UG/L  | 1    | 05/13/99 | 05/14/99 DDH |
| Chromium  | SW846 6010 | 13.9   | 5.0      | UG/L  | 1    | 05/13/99 | 05/14/99 DDH |
| Copper    | SW846 6010 | 18.3   | 5.0      | UG/L  | 1    | 05/13/99 | 05/14/99 DDH |
| Lead      | SW846 6010 | 12.8   | 3.0      | UG/L  | 1    | 05/13/99 | 05/14/99 DDH |
| Zinc      | SW846 6010 | 57.1   | 5.0      | UG/L  | 1    | 05/13/99 | 05/14/99 DDH |

GP ID: 9905045-03

Client ID: MWB-1

Matrix: WATER

Collected: 05/06/99

| Parameter | Method     | Result | Rep.Lim. | Units | Dil. | Prepared | Analyzed By  |
|-----------|------------|--------|----------|-------|------|----------|--------------|
| Mercury   | SW846 7470 | BQL    | 0.20     | UG/L  | 1    | 05/11/99 | 05/12/99 LCM |
| Arsenic   | SW846 6010 | 6.6    | 5.0      | UG/L  | 1    | 05/13/99 | 05/14/99 DDH |
| Cadmium   | SW846 6010 | BQL    | 3.0      | UG/L  | 1    | 05/13/99 | 05/14/99 DDH |
| Chromium  | SW846 6010 | 7.6    | 5.0      | UG/L  | 1    | 05/13/99 | 05/14/99 DDH |
| Copper    | SW846 6010 | 11.5   | 5.0      | UG/L  | 1    | 05/13/99 | 05/14/99 DDH |
| Lead      | SW846 6010 | 6.8    | 3.0      | UG/L  | 1    | 05/13/99 | 05/14/99 DDH |
| Zinc      | SW846 6010 | 37.4   | 5.0      | UG/L  | 1    | 05/13/99 | 05/14/99 DDH |

GPL LABORATORIES, LLLP  
WET CHEMISTRY ANALYSIS RESULTSGP ID: 9905045-01  
Client ID: MWB-3Matrix: WATER  
Collected: 05/06/99

| Parameter               | Method      | Result | Rep.Lim. | Units | Dil. | Prepared | Analyzed By  |
|-------------------------|-------------|--------|----------|-------|------|----------|--------------|
| Phosphorus, Total       | MCAWW 365.2 | BQL    | 0.020    | mg/L  | 1    | 05/07/99 | 05/07/99 SN  |
| Total Kjeldahl Nitrogen | MCAWW 351.3 | 0.748  | 0.100    | mg/L  | 1    | 05/11/99 | 05/11/99 AS  |
| Total Organic Carbon    | SW846 9060  | 5.60   | 1.00     | mg/L  | 1    |          | 05/14/99 VHM |

GP ID: 9905045-02  
Client ID: MWB-2Matrix: WATER  
Collected: 05/06/99

| Parameter               | Method      | Result | Rep.Lim. | Units | Dil. | Prepared | Analyzed By  |
|-------------------------|-------------|--------|----------|-------|------|----------|--------------|
| Phosphorus, Total       | MCAWW 365.2 | BQL    | 0.020    | mg/L  | 1    | 05/07/99 | 05/07/99 SN  |
| Total Kjeldahl Nitrogen | MCAWW 351.3 | 2.13   | 0.100    | mg/L  | 1    | 05/11/99 | 05/11/99 AS  |
| Total Organic Carbon    | SW846 9060  | 6.16   | 1.00     | mg/L  | 1    |          | 05/14/99 VHM |

GP ID: 9905045-03  
Client ID: MWB-1Matrix: WATER  
Collected: 05/06/99

| Parameter               | Method      | Result | Rep.Lim. | Units | Dil. | Prepared | Analyzed By  |
|-------------------------|-------------|--------|----------|-------|------|----------|--------------|
| Phosphorus, Total       | MCAWW 365.2 | 0.033  | 0.020    | mg/L  | 1    | 05/07/99 | 05/07/99 SN  |
| Total Kjeldahl Nitrogen | MCAWW 351.3 | 1.05   | 0.100    | mg/L  | 1    | 05/11/99 | 05/11/99 AS  |
| Total Organic Carbon    | SW846 9060  | 5.39   | 1.00     | mg/L  | 1    |          | 05/14/99 VHM |



**US Army Corps  
of Engineers**

**BALTIMORE DISTRICT**

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## **FINAL REPORT**

### **POTOMAC RIVER DREDGE MATERIAL STUDY**

**POTOMAC RIVER, MARYLAND**

Prepared by:  
Engineering Division  
U.S. Army Engineer District, Baltimore  
10 South Howard Street  
Baltimore, MD 21201

July 1998

TABLE 1  
SUMMARY OF SAMPLING DATA

| Sampled Name          | Boring Number | Boring Coordinates** | Linear Feet Sampled | BOH Elevation (ft.) | Soil Type(s) (USCS) |
|-----------------------|---------------|----------------------|---------------------|---------------------|---------------------|
|                       |               | Eastings             | Northings           |                     |                     |
| ALEXANDRIA WATERFRONT | AX-1          | 1301610              | 415110              | 6.0 feet            | -24.8 MLLW MH       |
|                       | AX-2          | 1302087              | 416733              | 2.0 feet            | -27.4 MLLW MH       |
| HUNTING CREEK         | HC-1          | 1302211              | 406143              | 4.0 feet            | -25.5 MLLW SP/SM    |
|                       | HC-2          | 1302524              | 404954              | 6.0 feet            | -25.5 MLLW SP/SM/MH |
| MARSHALL HALL         | MH-1          | 1281156              | 373009              | 2.0 feet            | -25.7 MLLW SC       |
| GUNSTON CREEK*        | GC-1          | 1275106              | 366736              | 2.0 feet            | -47.7 MLLW CH       |
|                       | GC-2          | 1277151              | 368802              | 2.0 feet            | -32.8 MLLW CH       |
| MATTAWOMAN            | MW-1          | 1254515              | 337330              | 2.0 feet            | -25.0 MLLW MH       |
|                       | MW-2          | 1252415              | 334675              | 2.0 feet            | -24.7 MLLW MH       |
|                       | MW-3          | 1302211              | 406143              | 4.0 feet            | -25.4 MLLW MH       |
|                       | MW-4          | 1249233              | 330802              | 6.0 feet            | -25.4 MLLW MH       |
|                       | MW-5          | 1247605              | 328758              | 6.0 feet            | -27.4 MLLW MH       |
|                       | MW-6          | 1245757              | 326409              | 4.0 feet            | -26.1 MLLW MH       |
| SANDY POINT           | SP-1          | 1232989              | 304523              | 2.0 feet            | -25.2 MLLW CH       |
|                       | SP-2          | 1232866              | 305600              | 2.0 feet            | -26.1 MLLW CH       |
| LIVERPOOL             | LP-1          | 1234568              | 286257              | 2.0 feet            | -25.3 MLLW CH       |
| SMITH POINT           | SMP-1         | 1235466              | 268240              | 4.0 feet            | -25.3 MLLW CH       |
|                       | SMP-2         | 1234931              | 276889              | 2.0 feet            | -25.0 MLLW CH       |
| LOWER SMITH POINT     | LS-1          | 1238589              | 261823              | 4.0 feet            | -25.0 MLLW CH       |
|                       | LS-2          | 1237567              | 263987              | 4.0 feet            | -26.2 MLLW CH       |
|                       | LS-3          | 1236391              | 266360              | 4.0 feet            | -25.7 MLLW CH       |
| MARYLAND POINT BAR    | MP-1          | 1245281              | 252355              | 4.0 feet            | -25.0 MLLW CH       |
|                       | MP-2          | 1243760              | 253361              | 4.0 feet            | -25.3 MLLW CH       |
|                       | MP-3          | 1240882              | 256940              | 6.0 feet            | -24.7 MLLW CH       |
|                       | MP-4          | 1238589              | 261823              | 4.0 feet            | -26.1 MLLW CH       |
| NANJEMOY              | NJ-1          | 1277658              | 263657              | 2.0 feet            | -25.0 MLLW CH       |
|                       | NJ-2          | 1280716              | 264598              | 4.0 feet            | -25.8 MLLW CH       |
|                       | NJ-3          | 1282926              | 265172              | 2.0 feet            | -25.1 MLLW CH       |
| ROUTE 301 BRIDGE*     | 301-1         | 1310825              | 260735              | 4.0 feet            | -26.5 MLLW CH       |
|                       | 301-2         | 1312172              | 255305              | 2.0 feet            | -26.5 MLLW CH       |
| KETTLE BOTTOM         | KB-1          | 1351120              | 209145              | 4.0 feet            | -26.7 MLLW CH       |
|                       | KB-2          | 1346952              | 211135              | 4.0 feet            | -26.4 MLLW CH       |

\* Potential Placement Area

\*\* Maryland State Plane Coordinate System (NAD 83)

2.3 Boring Positioning: Locations for each boring were established by marker buoy utilizing a Starlink D-NAV 212 Differential Global Positioning System (DGPS). Buoy markers were used for navigating boat and barge to a position as close as possible to boring coordinates. The final barge platform boring coordinates were checked by the onboard inspector using a

Sediment and associated properties are described according to recommendations suggested in U.S. Waterway Experiment Station (WES) Laboratory report "Geotechnical Factors in the Dredgeability of Sediments - Geotechnical Descriptors for Sediments to be Dredged". N-values were calculated by adding the last two blow counts for each 2 foot drive. Interpretation of surface geologic conditions (profiles) were beyond the scope of this study and were not constructed. The inspecting geologist's Field Boring Logs (not finalized by laboratory test results) are included in Appendix C. Index Calculations are presented in Appendix D.

**5.1 Alexandria:** Two borings, AX-1 and AX-2, were completed in the Alexandria Channel of the Potomac River. The channel bottom in this area was -18.8 and -25.4 feet below MLLW for borings AX-1 and AX-2 respectively. A total of 8 linear feet of sediment was sampled in the Alexandria Channel. A total of 6.9 feet was recovered. The total average recovery was 86% for SPT sampling for both borings.

**5.1.1 Sediment Classification, AX-1 & AX-2:** Mechanical analysis (grain size) was performed on one sample from boring AX-2. Atterberg limits, organic content, unit weight, and water content testing was performed only on one sediment sample from AX-1. Although both the field inspector and laboratory technician visually identified sediment from boring AX-1 as a plastic clay (CH), Atterberg Limit Testing completed on this sample classified the sediment as a elastic silt (MH). The silt contained a trace of sand (less than 15% by volume) with sand particle sizes ranging from the #3/8 to #200 screens. Organic matter was present in the upper two feet in both borings. Visually all sediment samples from both borings were similar in color, particles and grain sizes present, stiffness, stickiness and were identified as a plastic clay; however, laboratory testing indicates sediment material from the Alexandria Channel of the Potomac River is a elastic silt (MH) versus a plastic clay.

**5.1.2 Sediment Properties AX-1 & AX-2:** For the first two feet, sediment samples were penetrated by the weight of rod during SPT sampling in both borings. The weight of hammer was required to penetrate the next four feet of sediment in boring AX-1. Sediment material was also too soft to obtain hand-held penetrometer readings in any samples. Water content for the MH material averaged 98.5% for the sample tested from boring AX-1. The Liquidity Index and Activity Index calculated for sediment from boring AX-1 was 1.76 and 1.5 respectively.

**5.1.3 Sediment Interpretation AX-1 & AX-2:** All of the sediment encountered in this channel consists of a inorganic cohesive material (elastic silt - MH) with high Liquid Limits and high Water Content. Factors governing granular soil behavior including abrasive wear on machinery can be ignored from all material from these borings. Penetrometer readings for all samples were 0 tons/ft<sup>2</sup> indicating a material with very soft consistency and an associated in-situ shear strength of less than 25 kPa. Additionally N-Values were all 0 for each length of sediment sampled further verifying the low shear strength of this material. The calculated Plastic Index (PI) value for the tested sample exceeded 35 indicating non-friable properties. The Liquidity Index (LI) for sediment sample tested from boring AX-1 was greater than 1.0 indicating a "fluid-mud". Low consistency clay or silt material with PI values exceeding 35, likewise, will show no degradation when excavating and will tend to form clay balls. A problem that may be encountered with mechanical dredging will

be with the stickiness of the clay material. At a Water Content just above the Liquid Limits the water content of a saturated plastic clay or silt becomes greater than the plastic limit and the availability of free water for metal adhesion becomes greater and the clay/silt will bond with metal. The Activity Index of this sediment suggests that the clay is an illite (intermediate activity 1-2).

**5.2 Hunting Creek:** Two Borings were completed along this region of the Potomac River. Borings were designated as HC-1 and HC-2. The Hunting Creek channel bottom depth was recorded at -21.5 feet and -19.5 feet MLLW for borings HC-1 and HC-2 respectively. Total linear feet sampled from both borings was 10 feet with recovered sediments measuring 6.7 linear feet. Total recovery percentage for both borings was 67%.

**5.2.1 Sediment Classification HC-1 & HC-2:** The majority of sediment encountered in borings HC-1 and HC-2 consisted of a dusky yellow to olive gray, poorly-graded, silty sand (SP-SM/SM). Olive gray, elastic silt (MH) with a trace of sand was encountered in the last foot of sediment sampled (-24.5 MLLW sampling depth) in boring HC-2. The silty sand contained organic matter and shell debris. The sand particle size in both borings ranged from the #3/8 to #200 screens. Gravel in trace amounts (<15%) was present in the silty sand in boring HC-1. Sediment was penetrated by weight of hammer for all sampling lengths except for first two feet of sediment sampled in boring HC-1 which required weight of rod only.

**5.2.2 Sediment Properties HC-1 & HC-2:** Atterberg limits, organic content, unit weight, and water content testing were performed on the elastic silt encountered 5 feet below channel floor in HC-2. Mechanical analysis was performed on jar samples from the first two feet of sediment from both borings and the elastic silt in boring HC-2. All sediment samples were non-cohesive or too soft to collect a penetrometer reading. Water content for the elastic silt material at the bottom of boring HC-2 was 82.6%. The Liquidity and Activity Indexes calculated for the gray elastic silt (MH) in boring HC-2 was 1.02 and 2.0 respectively. The disturbed density for the MH material was 92.2 lb/ft<sup>3</sup>.

**5.2.3 Sediment Interpretation HC-1 & HC-2:** The silty sand that will be encountered in this area of the Potomac River can be expected to have densities ranging from 88.0 to 142.0 lb/ft<sup>3</sup>. N-Values were all 0 for each length sampled in the SP-SM material and indicates low shear strength. The silt encountered in boring HC-2 (-24.5 to -25.5 feet MLLW) consists of an inorganic cohesive material with high Liquid Limits and high Water Content. Penetrometer readings in this elastic silt material was 0 tons/ft<sup>2</sup> indicating a material with very soft consistency and an associated in-situ shear strength of less than 25 kPa. N-Values were all 0 for the length of MH material sampled and further confirms the low shear strength of this material. The calculated Plastic Index (PI) value for the MH material in boring HC-2 exceeded 35 indicating non-friable properties. Low consistency elastic silt material with PI values exceeding 35, likewise, will show no degradation when excavating and will tend to form clay balls. The Liquidity Index (LI) for the silt material in boring HC-2 was greater than 1.0 indicating a "fluid-mud". The Activity Index of the MH sediment suggests that the clay is an illite (intermediate activity 1-2).

**5.3 Marshal Hall:** One Boring was completed in the Marshal Hall channel of the Potomac River. This boring was identified as MH-1. Only Mechanical analysis (grain size) was performed on the one jar sample collected from this area. Atterberg limits, organic content, unit weight, and water content testing were not performed on sediment sampled from this area. A total of two linear feet (one SPT spoon) was sampled at this location. Recovery of sediment was 100%. The channel bottom depth was recorded at -25.7 at boring MH-1.

**5.3.1 Sediment Classification MH-1:** The sediment encountered in borings MH-1 consisted of light olive-gray to olive gray, fine grained, poorly graded, clayey sand (SC) with a trace of gravel. The sand particle size in both borings ranged from the #1/2 to #200 screens. Approximately 90% of all sand was smaller than the #40 screen.

**5.3.1.2 Sediment Properties and Sediment Interpretation MH-1:** N-Values were 0 for each of the 0.5 foot lengths of 2 feet of SC material sampled. The unconfined compressive strength of the clayey sand is estimated to be < 0.25 ton/ft<sup>2</sup> with a corresponding low shear strength. The clay sand can be expected to have densities ranging from 88.0 to 142.0 lb/ft<sup>3</sup>. The Plastic, Liquidity, or Activity Index were not calculated for this silty sand.

**5.4 Gunston Creek:** Two Borings were completed in this potential dredge material placement area. Sediment sampling from each boring consisted of collecting a 2 foot long split spoon for a total of 4 linear feet of sediment material sampled in the Gunston Creek area. Mechanical analysis was the only test performed on jar samples collected from the first two feet of sediment in both borings GC-1 and GC-2. Recovery for both borings was 100%. The channel bottom was recorded at -45.7 feet and -30.8 feet MLLW for boring GC-1 and GC-2 respectively.

**5.4.1 Sediment Classification, Properties and Interpretation of Borings GC-1 & GC-2:** Sediment encountered in borings GC-1 and GC-2 consisted of an olive gray, inorganic, very soft, plastic clay (CH) with a trace of gravel and sand. Sand particles size in both borings ranged from the #1/2 to #200 screens. Approximately 85% of all sand analyzed was smaller than the #200 screen. All penetrometer readings in the plastic clay material were 0 tons/ft<sup>2</sup>. N-Values were also 0 for all lengths of CH material sampled and indicated low shear strength of this material. The Plastic, Liquidity, Activity Indexes were not calculated for the clay. Atterberg Limits and Water Content tests were not performed for these sediment samples but it can be estimated that the plastic clay in both borings have high Water Content and Liquid Limits based on the very soft consistency and an associated in-situ shear strength of less than 25 kPa.

**5.5 Mattawoman:** Six Borings were completed in the Mattawoman channel of the Potomac River. Borings were numbered MW-1 thru MW-6. The Mattawoman channel depth averaged -21.6 feet MLLW with a deepest depth of -19.4 feet and a shallowest depth of -23.0 feet MLLW. A total of 24 linear feet of sediment was sampled from the six borings with 16.8 feet of sediment recovered for a total recovery percentage of 84%. All sediment material was penetrated by weight of rod or weight of hammer.

**5.5.1 Sediment Classification MW-1 thru MW-6:** Mechanical analysis (grain size) was performed on the 6 jar samples collected from this area. Atterberg limits, organic content,

unit weight, and water content testing were also performed on sediment samples from borings MW-1, MW-3, and MW-5. All of the sediment samples in the Mattawoman Channel were identified as a plastic clay by the laboratory technician during visual identifications. Atterberg Limit testing completed on these samples classified the sediment in this channel as a elastic silt (MH).

**5.5.2 Sediment Properties MW-1 thru MW-6:** All penetrometer readings in the elastic silt (MH) material were 0 tons/ft<sup>2</sup>. N-Values were also all 0 for each length of MH material sampled further verifying the low shear strength of this material. The silt contained a trace of sand (less than 15% by volume) with sand particle sizes ranging from the #4 to #200 screens. Approximately 95% of all sand analyzed was smaller than the #200 screen. Water contents for the three samples tested were very high and averaged 169.1%. The Liquidity and Activity Indexes calculated for the elastic silt (MH) averaged 2.7 and 2.2 respectively. The disturbed densities for the MH material were 81.9, 78.8, and 80.7 lb/ft<sup>3</sup> for borings MW-1, MW-3, and MW-5 respectively.

**5.5.3 Sediment Interpretation MW-1 thru MW-6 :** The silt encountered in the Mattawoman channel consists of a slightly organic cohesive material (elastic silt - MH) with high Liquid Limits and high Water Contents. Penetrometer readings in this material was 0 tons/ft<sup>2</sup> indicating a material with very soft consistency and an associated in-situ shear strength of less than 25 kPa. The calculated Plastic Index (PI) values for the silt material in borings MW-1, MW-3, and MW-5 exceeded 40 indicating non-friable properties. Low consistency material with PI values exceeding 35, likewise, will show no degradation when excavating and will tend to form clay/silt balls. The Liquidity Index (LI) for the silt in this channel was greater than 1.0 indicating a "fluid-mud". The Activity Index of this sediment suggests that any clay present is illite (intermediate activity 1-2).

**5.6 Sandy Point:** Two borings were completed in the Sandy Point channel. Channel depths were sounded at -23.2 and -24.1 feet MLLW for boring SP-1 and SP-2 respectively. A total of 4 linear feet of sediment was sampled from the 2 borings with 100% recovery of sediment.

**5.6.1 Sediment Classification SP-1 & SP-2:** Mechanical analysis (grain size) was performed on the 2 jar samples collected from this area. Atterberg limits, organic content, unit weight, and water content testing were also performed on the sediment sample from boring SP-2. All sediment material was penetrated by weight of rod.

**5.6.2 Sediment Properties - SP-1 & SP-2:** All penetrometer readings in the CH material were 0 tons/ft<sup>2</sup>. N-Values were all 0 for each length of CH material sampled indicating the low shear strength. Sand was not present in either sediment samples collected from the two borings. Water contents for the sample tested for SP-2 was very high - 163.8%. The Liquidity and Activity Indexes calculated for the for this sample were 2.0 and 3.4 respectively. The disturbed densities for the CH material was 83.1 lb/ft<sup>3</sup>.

**5.6.3 Sediment Interpretation - SP-1 & SP-2:** The clay encountered in the Sandy Point channel consists of a slightly organic, very soft, plastic clay with high Liquid Limits and high Water Content. Penetrometer readings in this material was 0 tons/ft<sup>2</sup> indicating a material with very soft consistency and an associated in-situ shear strength of less than 25

**PROJECT: Potomac River Dredge Material**

**AREA:** Potomac River, MD

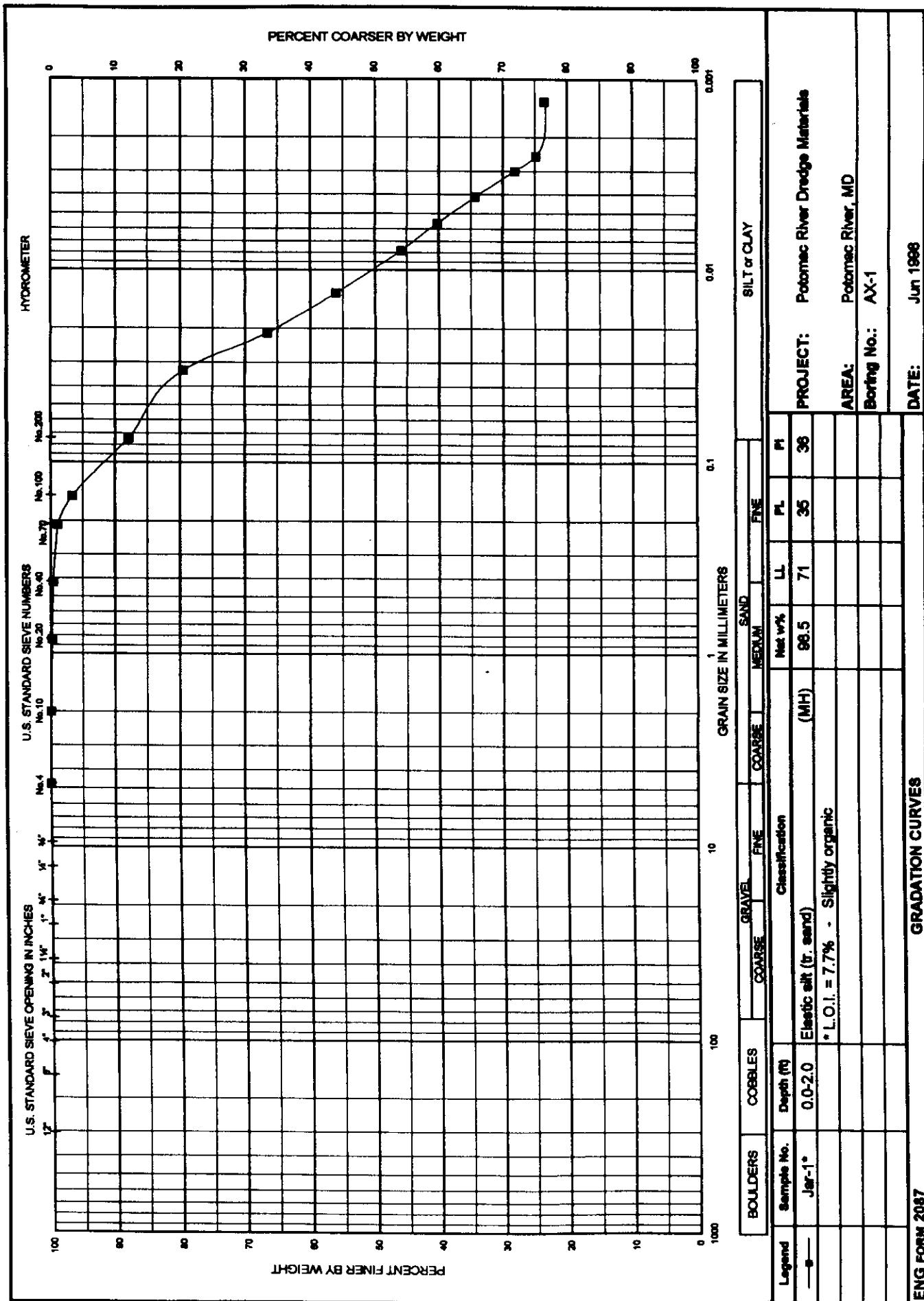
**TEST:** In-Situ Density Test

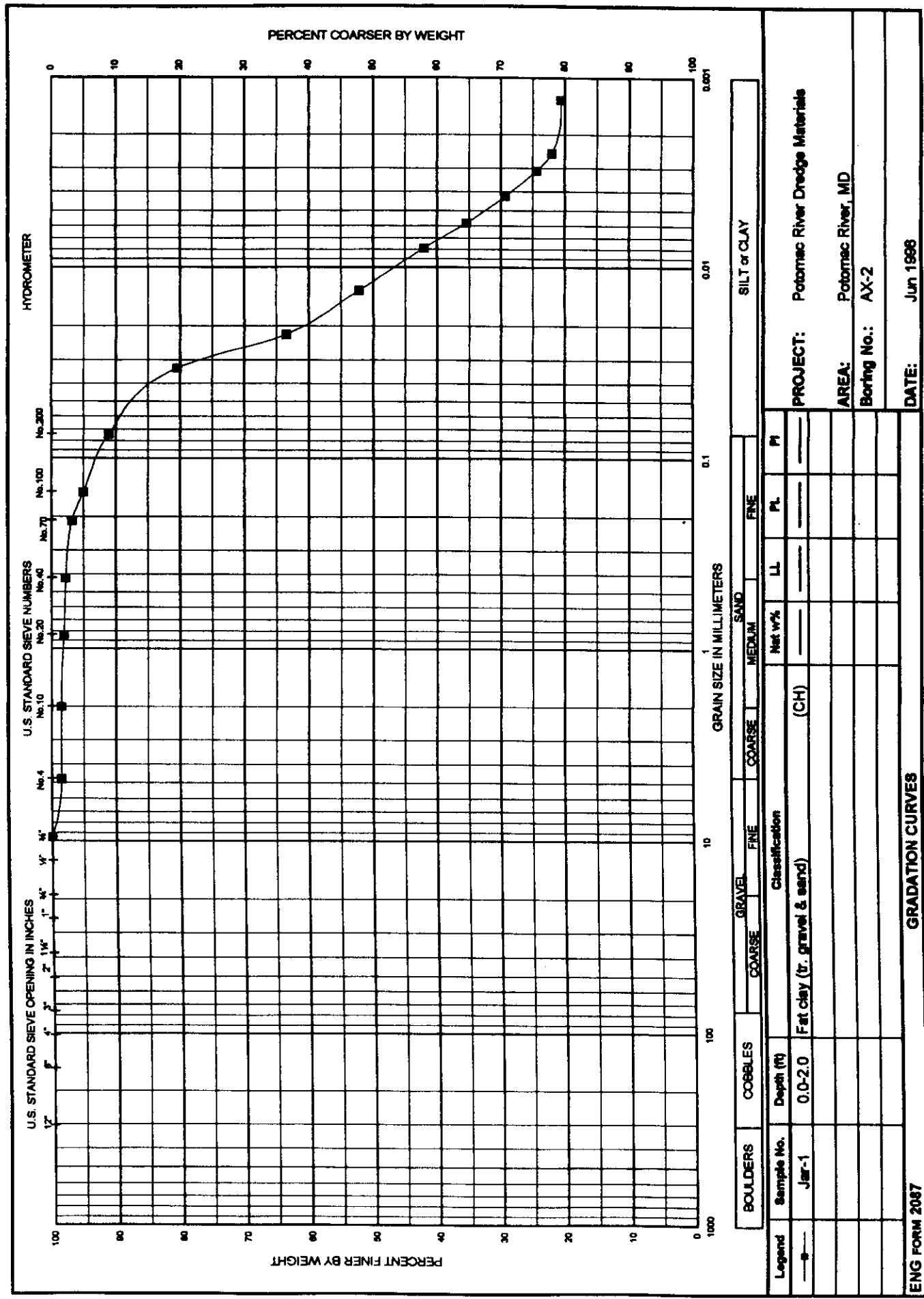
**LABORATORY TEST RESULTS**

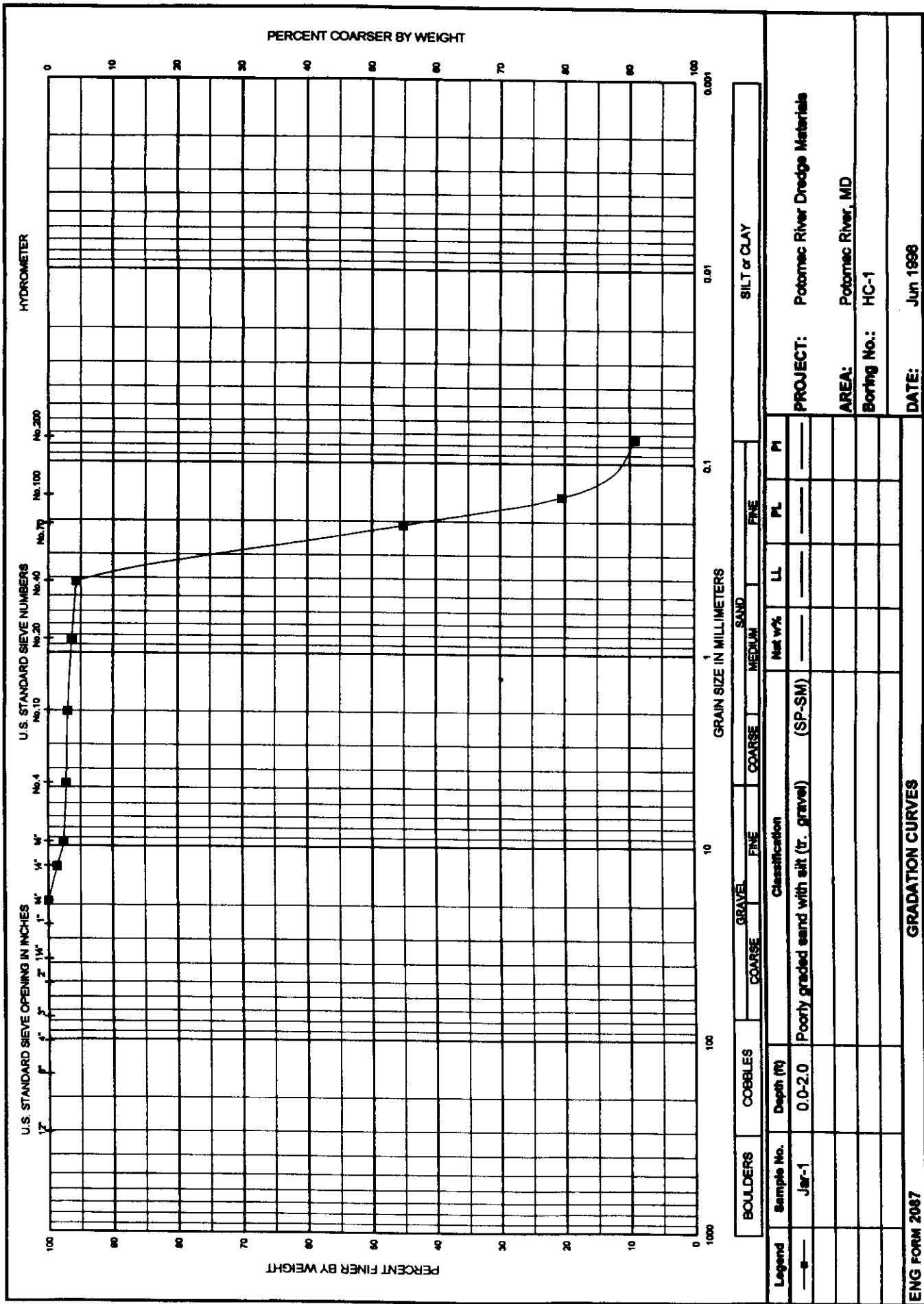
**DATE: Jun 1998**

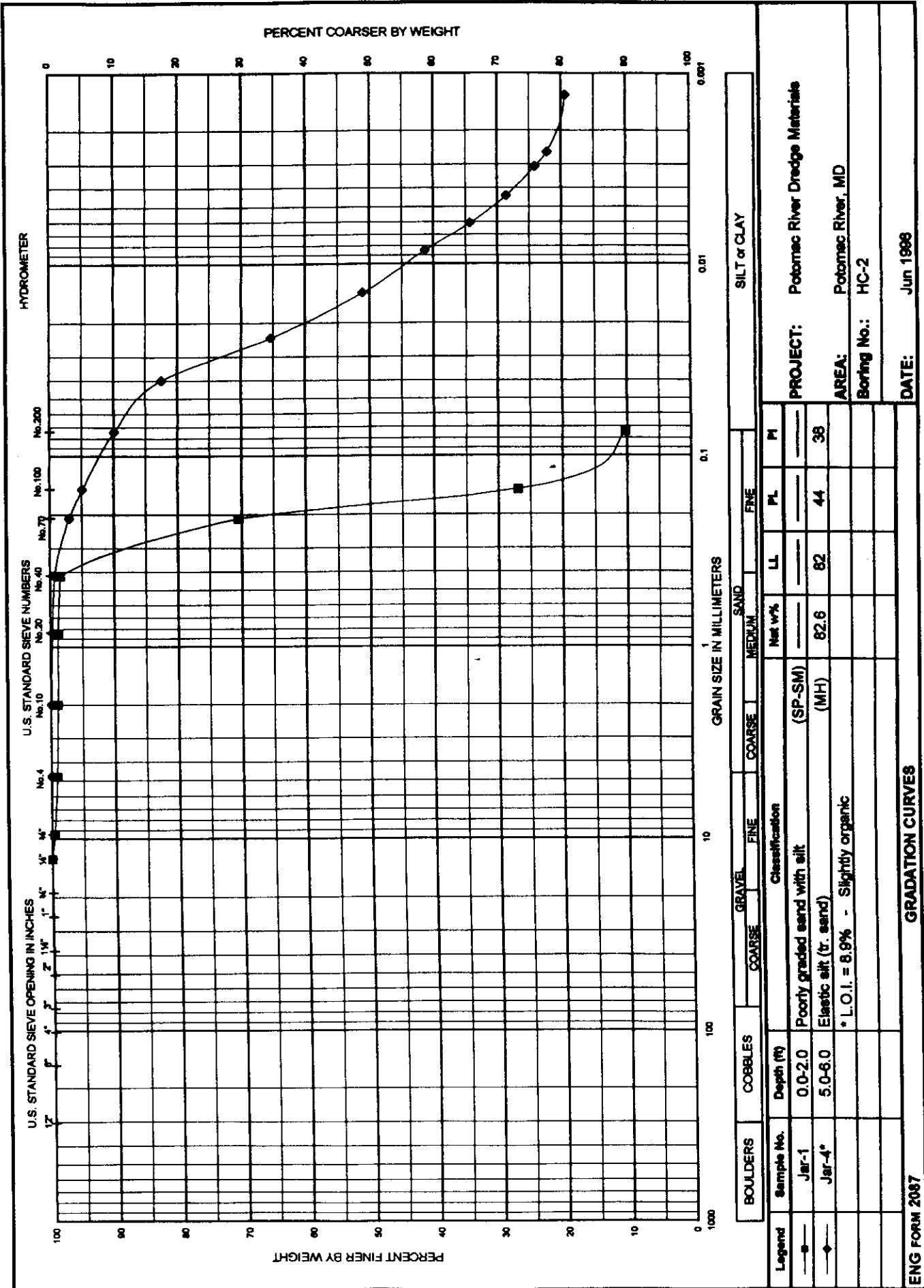
**Page 1 of 1**

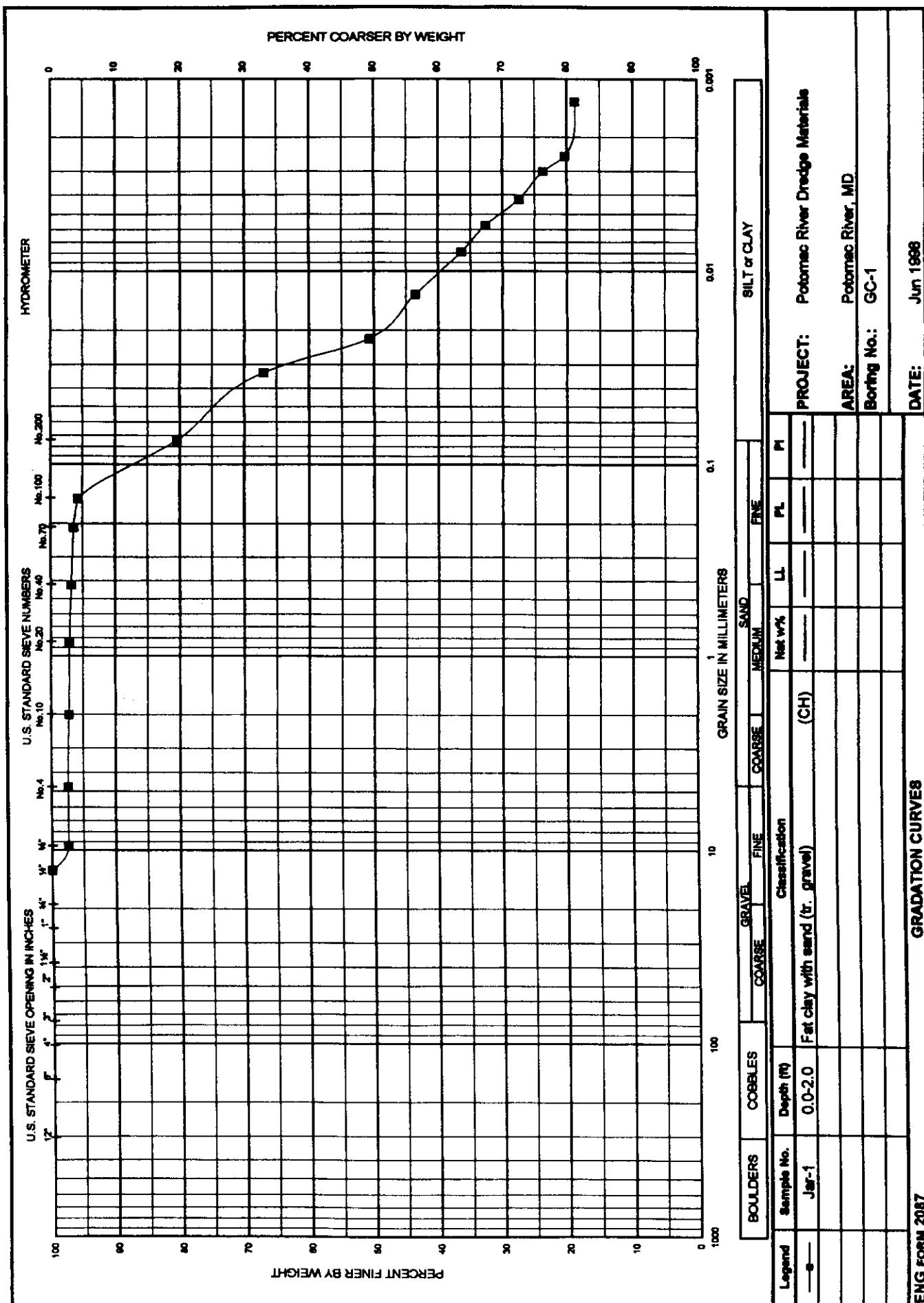
| Hole No. | Sample No. | Depth (ft) | Nat. w% | Density perf | L.O.I | LL  | PI | Classification          | Symbol  |
|----------|------------|------------|---------|--------------|-------|-----|----|-------------------------|---------|
|          |            |            |         |              |       |     |    |                         | In-Situ |
| AX-1     | Jar-1      | 0.0-2.0    | 98.5    | 90.5         | 7.7   | 71  | 35 | Elastic silt (fr. sand) | (MH)    |
| HC-2     | Jar-4      | 5.0-6.0    | 82.6    | 92.2         | 8.9   | 82  | 44 | Elastic silt (fr. sand) | (MH)    |
| LS-2     | Jar-1      | 0.0-2.0    | 210.4   | 78.0         | 7.6   | 101 | 38 | Fat clay                | (CH)    |
| MP-2     | Jar-1      | 0.0-2.0    | 219.3   | 76.9         | 8.2   | 99  | 37 | Fat clay                | (CH)    |
| MP-4     | Jar-1      | 0.0-2.0    | 204.7   | 79.6         | 7.5   | 117 | 41 | Fat clay                | (CH)    |
| MW-1     | Jar-1      | 0.0-2.0    | 155.4   | 81.9         | 8.5   | 84  | 42 | Elastic silt (fr. sand) | (MH)    |
| MW-3     | Jar-1      | 0.0-2.0    | 173.9   | 78.7         | 9.4   | 87  | 42 | Elastic silt (fr. sand) | (MH)    |
| MW-5     | Jar-1      | 0.0-2.0    | 178.1   | 80.7         | 10.2  | 98  | 43 | Elastic silt            | (MH)    |
| NJ-1     | Jar-1      | 0.0-2.0    | 154.6   | 82.1         | 8.7   | 108 | 39 | Fat clay                | (CH)    |
| SMP-1    | Jar-1      | 0.0-2.0    | 257.4   | 76.6         | 9.3   | 115 | 43 | Fat clay                | (CH)    |
| SP-2     | Jar-1      | 0.0-2.0    | 163.8   | 83.1         | 8.9   | 100 | 39 | Fat clay                | (CH)    |
|          |            |            |         |              |       |     | 61 |                         |         |

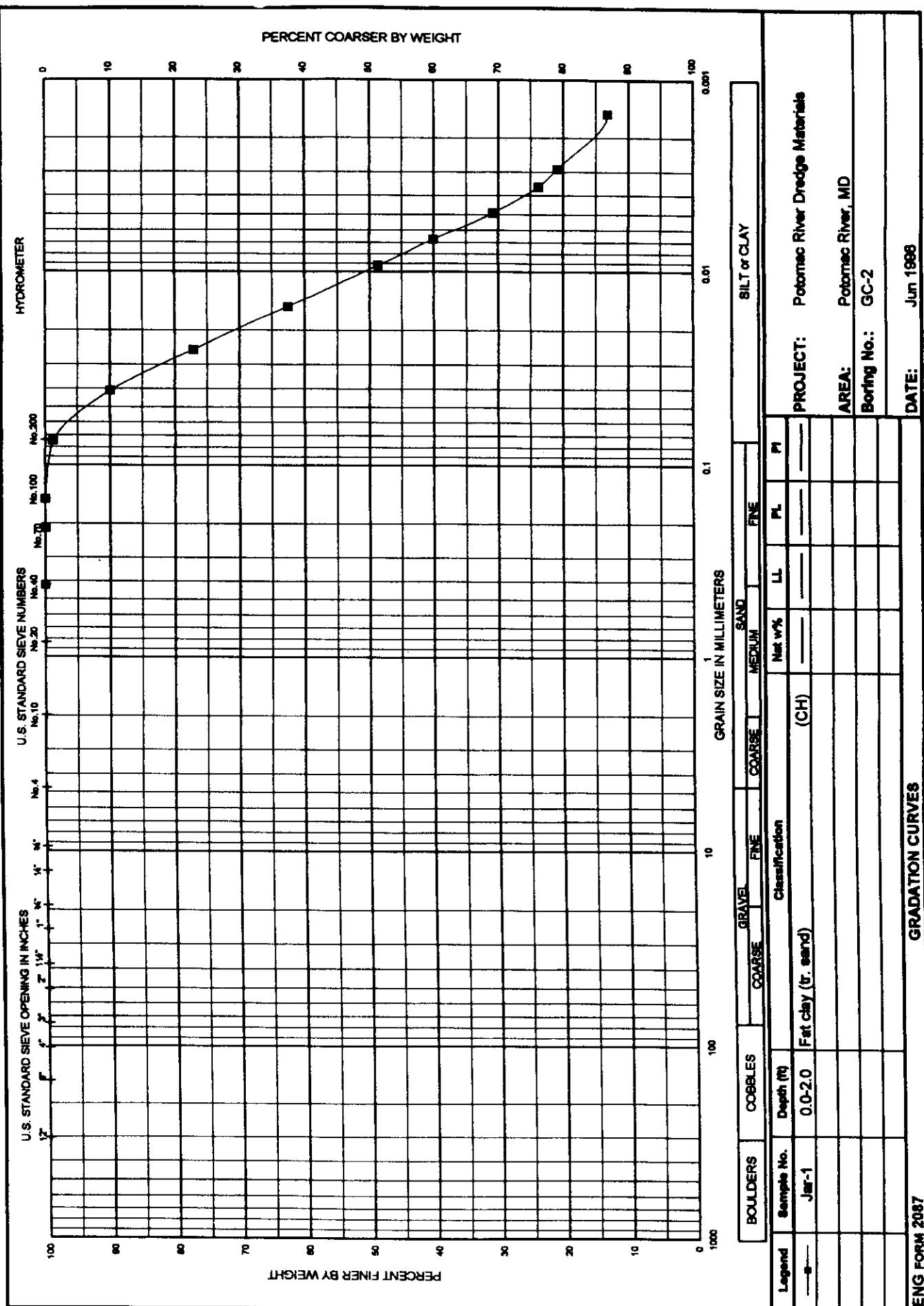


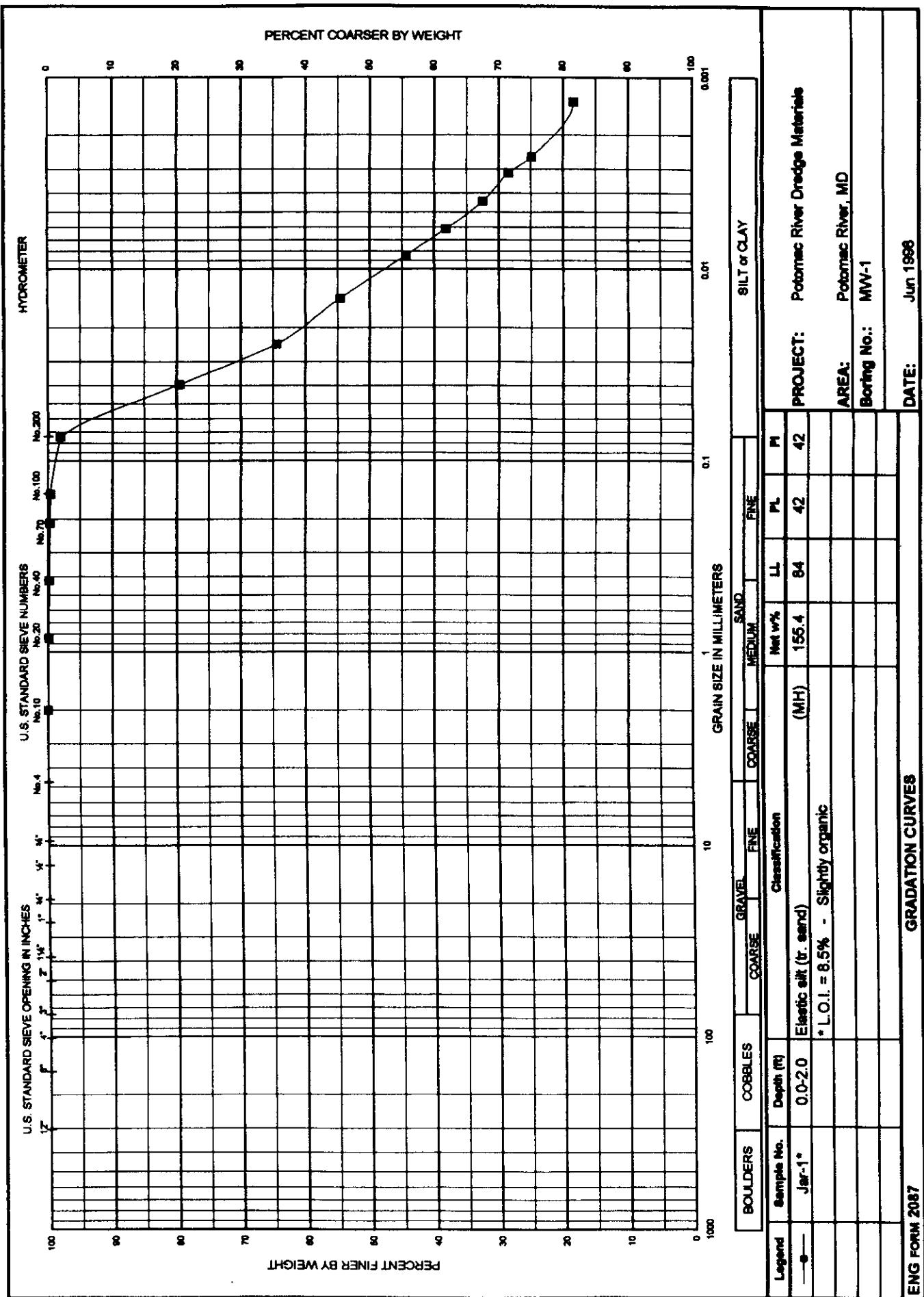


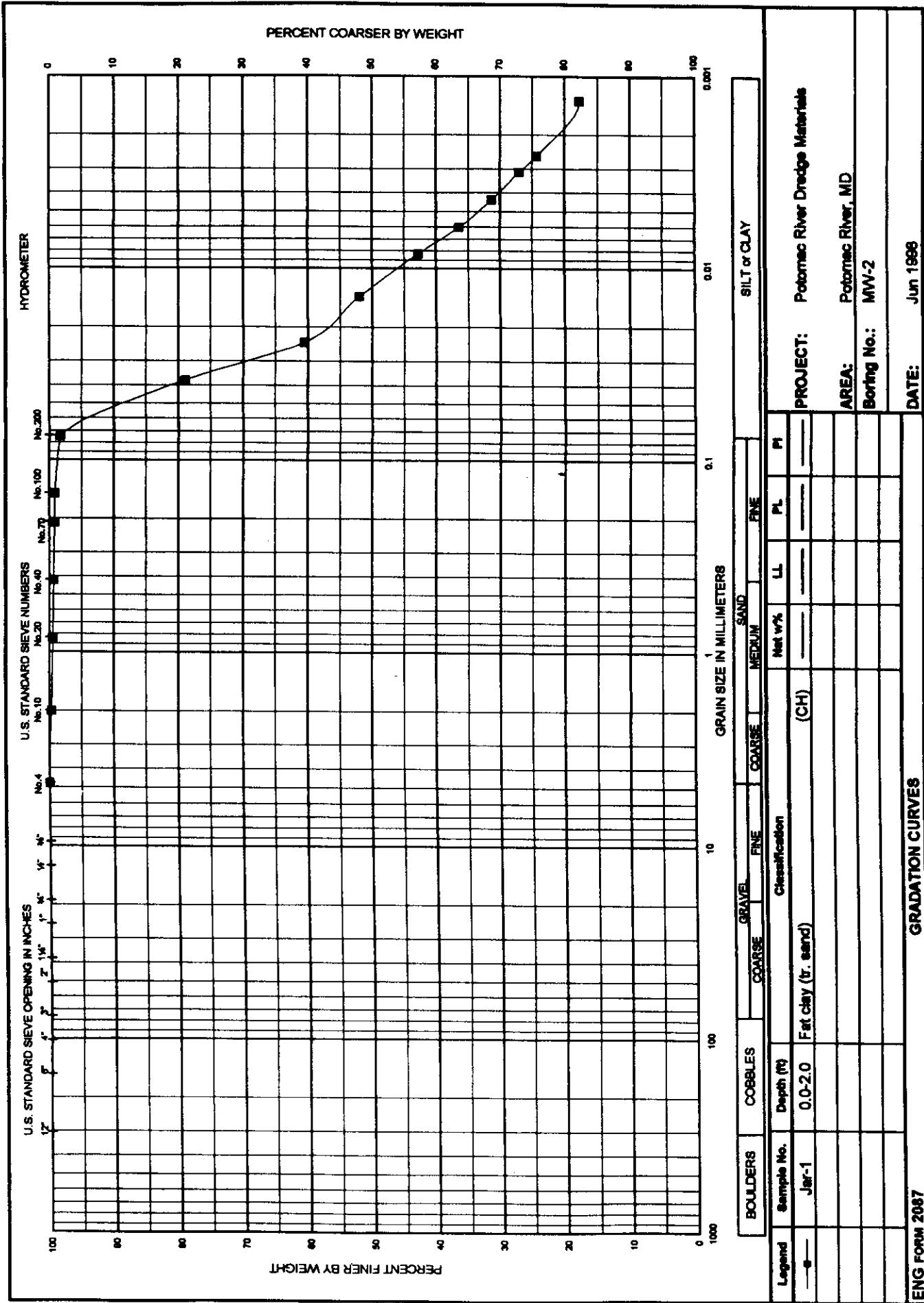


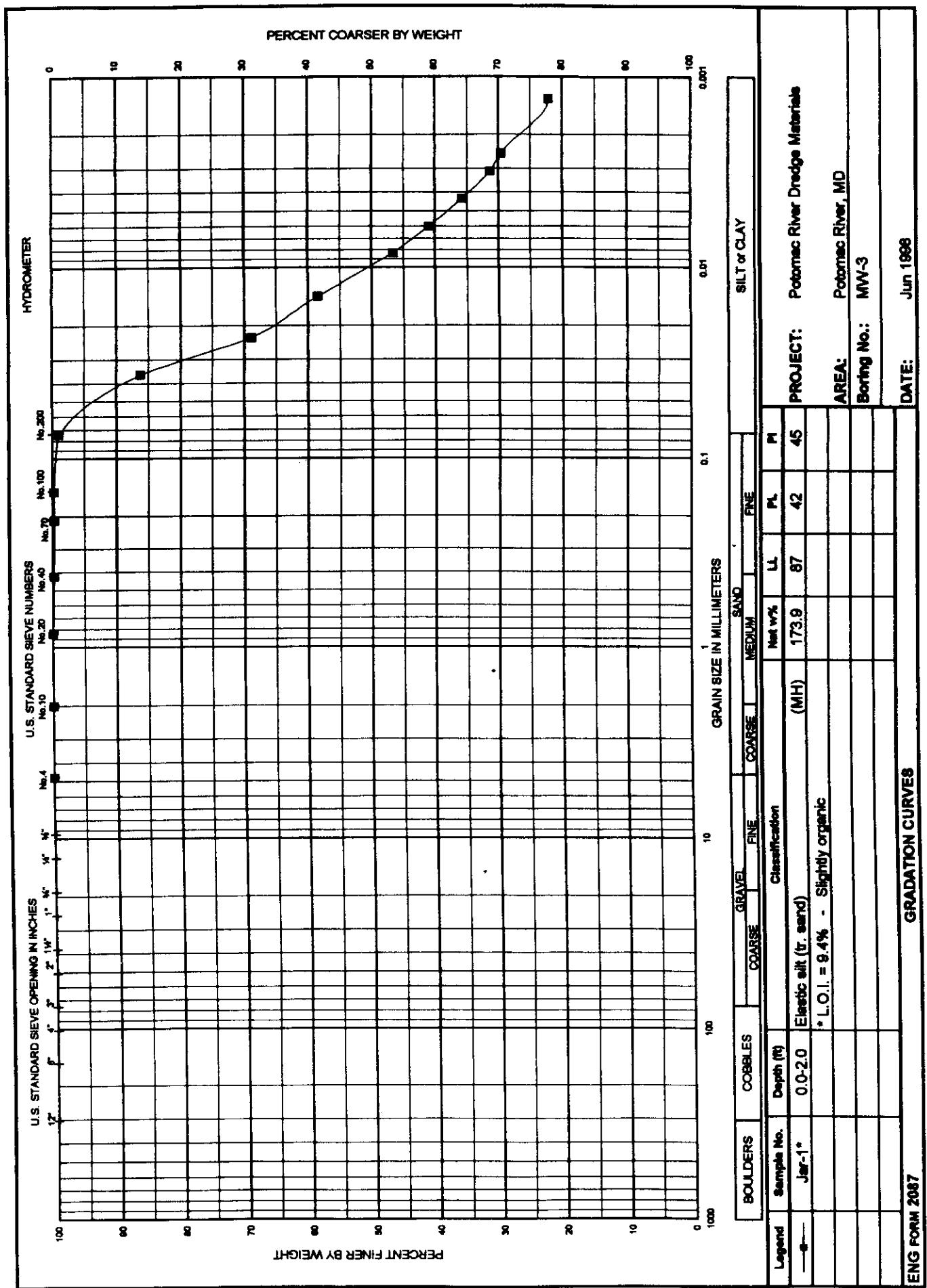


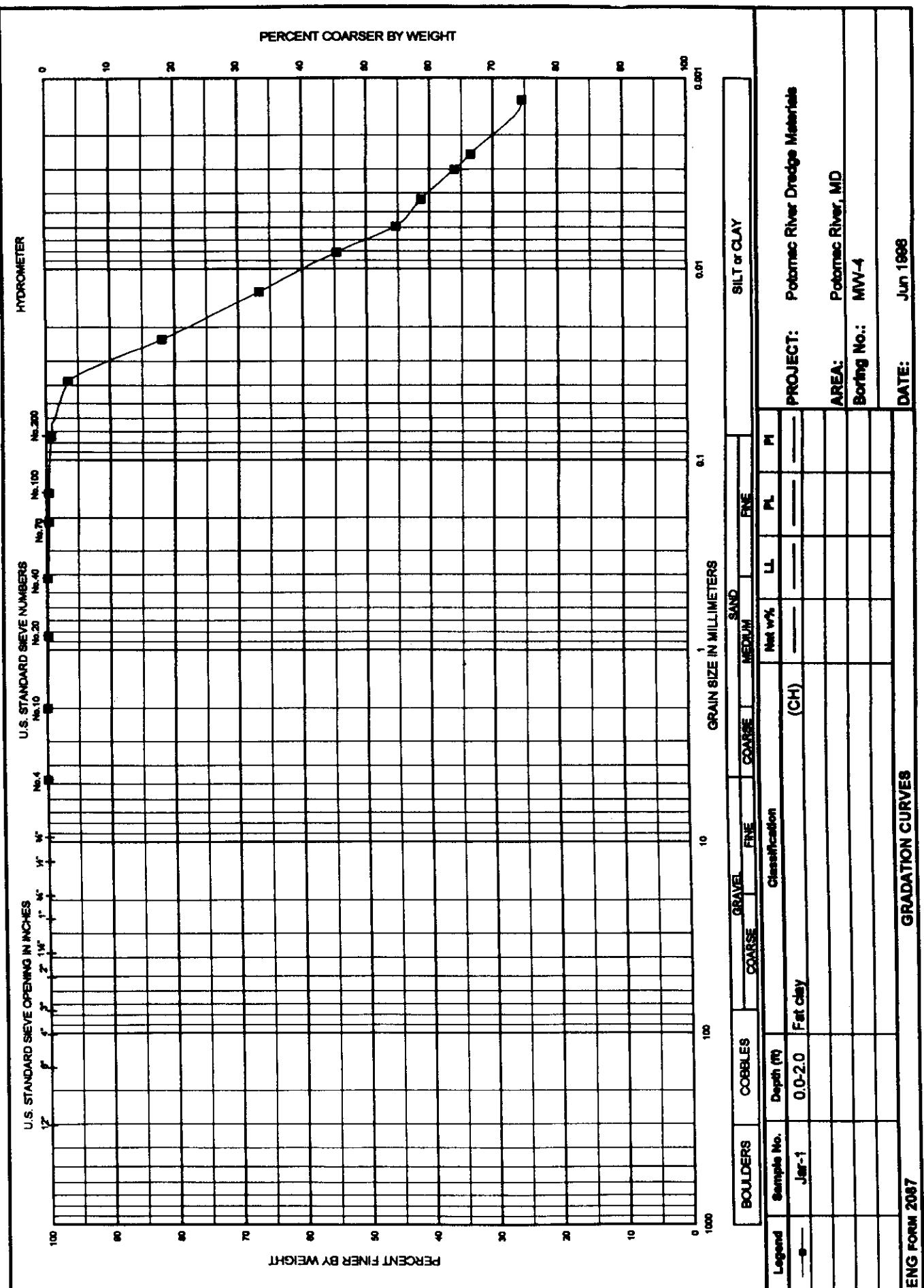


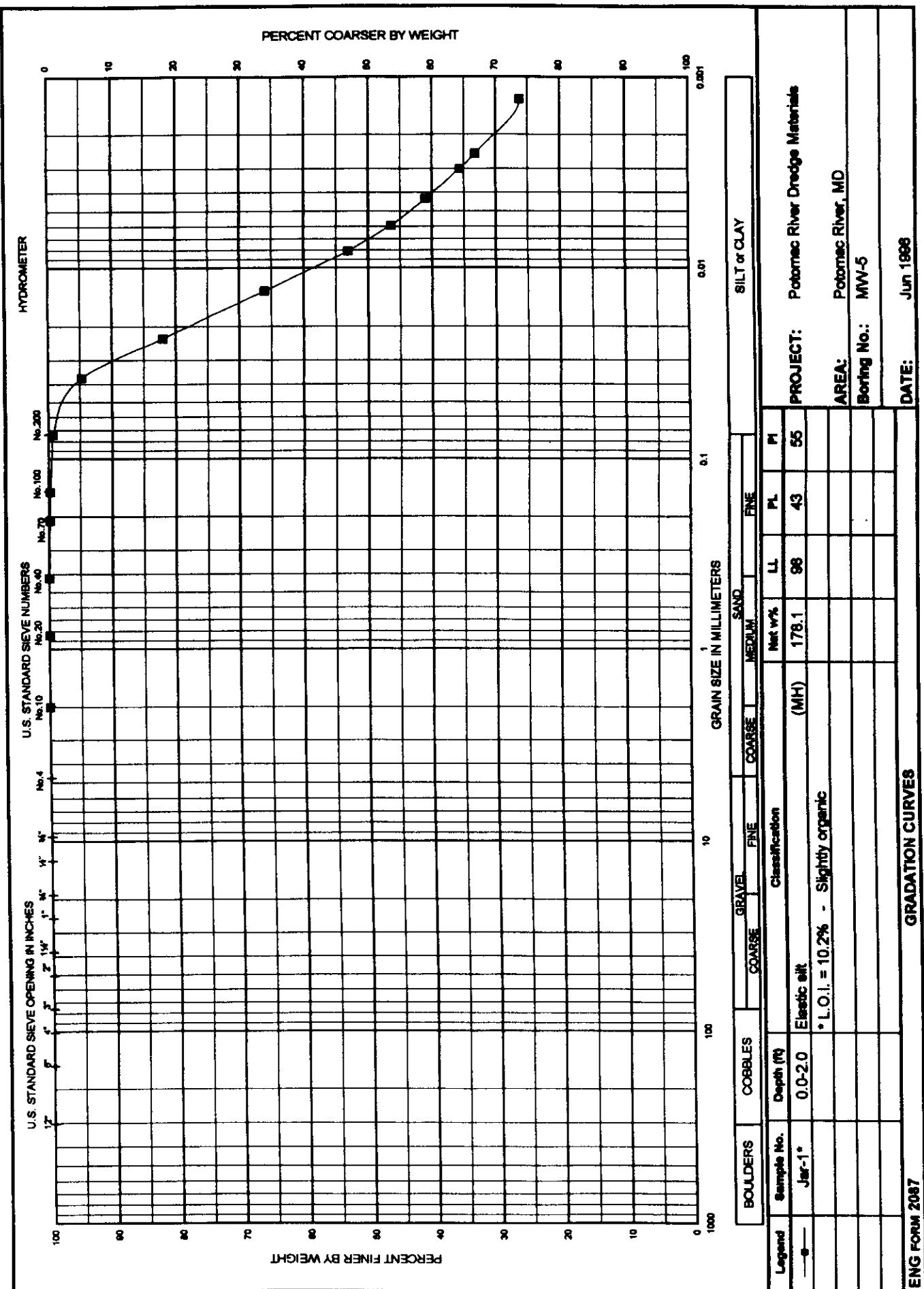


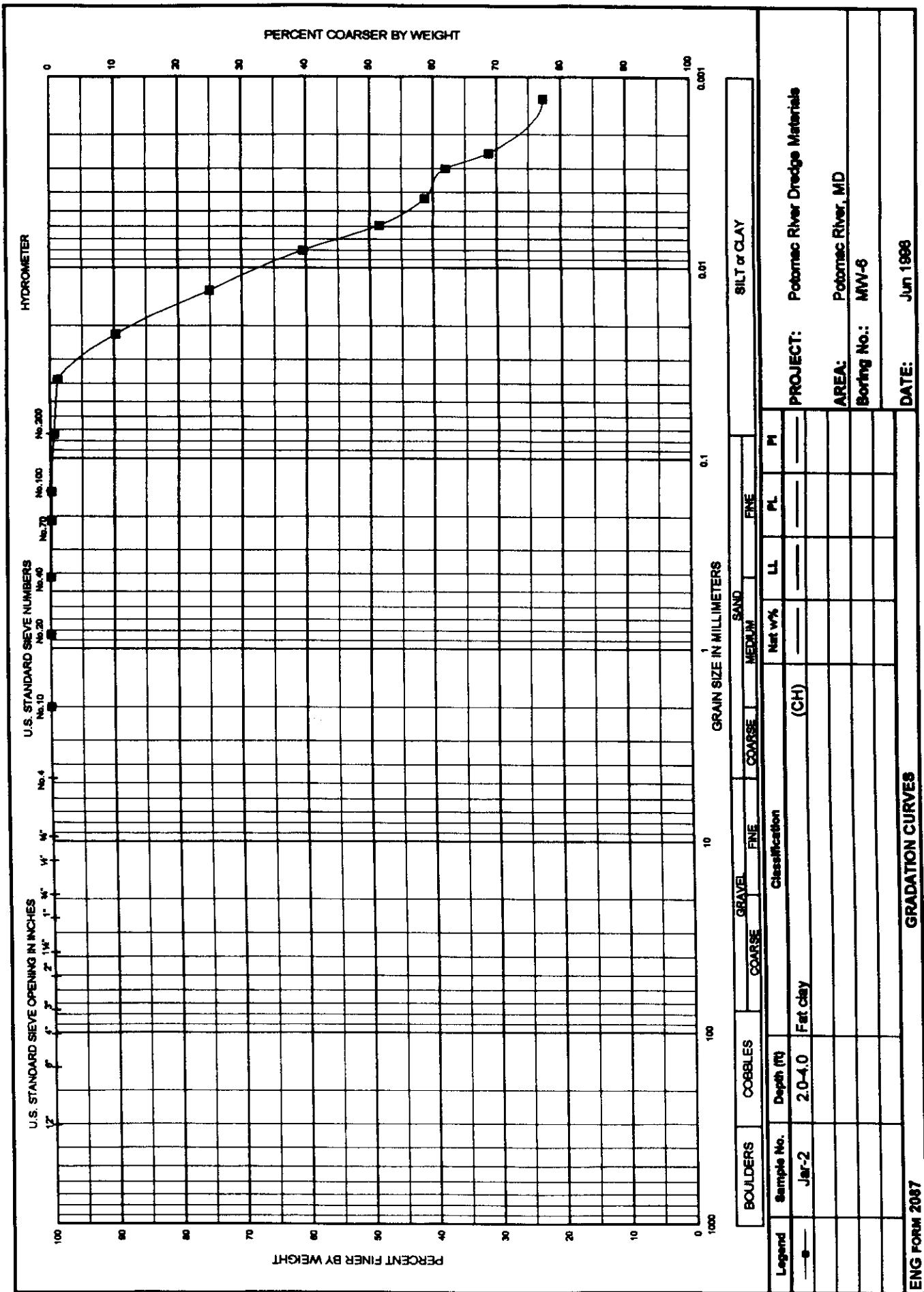












# **FINAL REPORT**

## **SAMPLING AND ANALYSIS ON THE POTOMAC RIVER CHANNEL**

**Prepared For:**  
**Baltimore Corps of Engineers**  
**CENAB, Environmental Analysis Branch**  
**109 Market Place**  
**Baltimore, MD 21202**  
**(301) 962-4997**

**Prepared By:**  
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**(301) 776-8388**

**Project No: 903201**  
**Contract No: DACW3189D0060**

**Date: October 15, 1990**

## CHEMALYSIS INCORPORATED

VOLATILE ORGANIC ANALYSIS RESULTS  
EPA Method 8240

Client: Baltimore Corps of Engineers      Lab ID: 9004309  
 Client ID: #1      Date Sampled: 09/16/90  
 Location: Alexandria Waterfront      Time Sampled: 10:01AM  
 Water Depth: 24 Ft      Moisture(%): 57  
 Matrix: Sediment Core      Date Analyzed: 09/18/90

| CAS Number | Parameter                  | Quantitative Detection |       | Concentration<br>Detected, ug/Kg | Q |
|------------|----------------------------|------------------------|-------|----------------------------------|---|
|            |                            | Limit, ug/Kg           | ----- |                                  |   |
| 74-87-3    | Chloromethane              | 470                    |       | ND                               |   |
| 74-83-9    | Bromomethane               | 470                    |       | ND                               |   |
| 75-01-4    | Vinyl Chloride             | 470                    |       | ND                               |   |
| 75-00-3    | Chloroethane               | 470                    |       | ND                               |   |
| 75-09-2    | Methylene Chloride         | 230                    |       | ND                               |   |
| 67-64-1    | Acetone                    | 470                    |       | 890                              | B |
| 75-15-0    | Carbon Disulfide           | 230                    |       | ND                               |   |
| 75-69-4    | Trichlorofluoromethane     | 470                    |       | ND                               |   |
| 75-35-4    | 1,1-Dichloroethene         | 230                    |       | ND                               |   |
| 75-34-3    | 1,1-Dichloroethane         | 230                    |       | ND                               |   |
| 540-59-0   | 1,2-Dichloroethene (total) | 230                    |       | ND                               |   |
| 67-66-3    | Chloroform                 | 230                    |       | ND                               |   |
| 107-06-2   | 1,2-Dichloroethane         | 230                    |       | ND                               |   |
| 78-93-3    | 2-Butanone                 | 470                    |       | ND                               |   |
| 71-55-6    | 1,1,1-Trichloroethane      | 230                    |       | ND                               |   |
| 56-23-5    | Carbon Tetrachloride       | 230                    |       | ND                               |   |
| 108-05-4   | Vinyl Acetate              | 470                    |       | ND                               |   |
| 75-27-4    | Bromodichloromethane       | 230                    |       | ND                               |   |
| 78-87-5    | 1,2-Dichloropropane        | 230                    |       | ND                               |   |
| 10061-02-6 | trans-1,3-Dichloropropene  | 230                    |       | ND                               |   |
| 79-01-6    | Trichloroethene            | 230                    |       | ND                               |   |
| 124-48-1   | Dibromochloromethane       | 230                    |       | ND                               |   |
| 79-00-5    | 1,1,2-Trichloroethane      | 230                    |       | ND                               |   |
| 71-43-2    | Benzene                    | 230                    |       | ND                               |   |
| 10061-01-5 | cis-1,3-Dichloropropene    | 230                    |       | ND                               |   |
| 110-75-8   | 2-Chloroethyl vinyl ether  | 470                    |       | ND                               |   |
| 75-25-2    | Bromoform                  | 230                    |       | ND                               |   |
| 591-78-6   | 2-Hexanone                 | 470                    |       | ND                               |   |
| 108-10-1   | 4-Methyl-2-pentanone       | 470                    |       | ND                               |   |
| 127-18-4   | Tetrachloroethene          | 230                    |       | ND                               |   |
| 79-34-5    | 1,1,2,2-Tetrachloroethane  | 230                    |       | ND                               |   |
| 108-88-3   | Toluene                    | 230                    |       | ND                               |   |
| 108-90-7   | Chlorobenzene              | 230                    |       | ND                               |   |
| 100-41-4   | Ethylbenzene               | 230                    |       | ND                               |   |
| 100-42-5   | Styrene                    | 230                    |       | ND                               |   |
| 1330-20-7  | Total Xylenes              | 230                    |       | ND                               |   |

Project #: 903201 ug/Kg on Dry Weight Basis

ND: Denotes less than stated quantitative detection limit

Q: Qualifier: B: Denotes present in blank

T: Denotes trace level detected

## CHEMALYSIS INCORPORATED

SEMICVOLATILE ANALYSIS RESULTS  
EPA Method 8270

|            |                              |                 |          |
|------------|------------------------------|-----------------|----------|
| Client:    | Baltimore Corps of Engineers | Lab ID:         | 9004309  |
| Client ID: | #1                           | Date Sampled:   | 09/16/90 |
| Location:  | Alexandria Waterfront        | Time Sampled:   | 10:01AM  |
| Depth:     | Water - 24 Ft                | Moisture (%):   | 57       |
| Matrix:    | Sediment Core                | Date Extracted: | 09/18/90 |
| Units:     | ug/Kg                        | Date Analyzed:  | 09/19/90 |

| CAS No.  | Parameter                   | Quant. | Conc. | D.L.      | Detected                   | Q                      | CAS No. | Parameter | Quant. | Conc. | D.L. | Detected | Q |
|----------|-----------------------------|--------|-------|-----------|----------------------------|------------------------|---------|-----------|--------|-------|------|----------|---|
| 108-95-2 | Phenol                      | 770    | ND    | 122-66-7  | 1,2-Diphenylhydrazine      |                        | 770     | ND        | 770    | ND    |      |          |   |
| 111-44-4 | bis(2-Chloroethyl)ether     | 770    | ND    | 99-09-2   | 3-Nitroaniline             |                        | 3800    | ND        |        |       |      |          |   |
| 95-57-8  | 2-Chlorophenol              | 770    | ND    | 53-32-9   | Acenaphthene               |                        | 770     | ND        |        |       |      |          |   |
| 541-73-1 | 1,3-Dichlorobenzene         | 770    | ND    | 51-28-5   | 2,4-Dinitrophenol          |                        | 3800    | ND        |        |       |      |          |   |
| 106-46-7 | 1,4-Dichlorobenzene         | 770    | ND    | 100-02-7  | 4-Nitrophenol              |                        | 3800    | ND        |        |       |      |          |   |
| 100-51-6 | Benzyl alcohol              | 770    | ND    | 132-64-9  | Dibenzofuran               |                        | 770     | ND        |        |       |      |          |   |
| 95-50-1  | 1,2-Dichlorobenzene         | 770    | ND    | 121-14-2  | 2,4-Dinitrotoluene         |                        | 770     | ND        |        |       |      |          |   |
| 95-48-7  | 2-Methylphenol              | 770    | ND    | 84-66-2   | Diethylphthalate           |                        | 770     | ND        |        |       |      |          |   |
| 108-60-1 | bis(2-Chloroisopropyl)ether | 770    | ND    | 7005-72-3 | 4-Chlorophenyl-phenylether |                        | 770     | ND        |        |       |      |          |   |
| 106-44-5 | 4-Methylphenol              | 770    | ND    | 86-73-7   | Fluorene                   |                        | 770     | ND        |        |       |      |          |   |
| 621-64-7 | N-Nitoso-di-n-dipropylamine | 770    | ND    | 100-01-6  | 4-Nitroaniline             |                        | 3800    | ND        |        |       |      |          |   |
| 67-72-1  | Hexachloroethane            | 770    | ND    | 534-52-1  | 4,6-Dinitro-2-methylphenol |                        | 3800    | ND        |        |       |      |          |   |
| 98-95-3  | Nitrobenzene                | 770    | ND    | 86-30-6   | N-Nitrosodiphenylamine     |                        | 770     | ND        |        |       |      |          |   |
| 78-59-1  | Isophorone                  | 770    | ND    | 101-55-3  | 4-Bromophenyl-phenylether  |                        | 770     | ND        |        |       |      |          |   |
| 88-75-5  | 2-Nitrophenol               | 770    | ND    | 118-74-1  | Hexachlorobenzene          |                        | 770     | ND        |        |       |      |          |   |
| 105-67-9 | 2,4-Dimethylphenol          | 770    | ND    | 87-86-5   | Pentachlorophenol          |                        | 3800    | ND        |        |       |      |          |   |
| 65-85-0  | Benzoic acid                | 3800   | ND    | 85-01-8   | Phenanthrene               |                        | 770     | ND        |        |       | T    |          |   |
| 111-91-1 | bis(2-Chloroethoxy)methane  | 770    | ND    | 120-12-7  | Anthracene                 |                        | 770     | ND        |        |       |      |          |   |
| 120-83-2 | 2,4-Dichlorophenol          | 770    | ND    | 84-74-2   | Di-n-butylphthalate        |                        | 770     | ND        |        |       |      |          |   |
| 120-82-1 | 1,2,4-Trichlorobenzene      | 770    | ND    | 206-44-0  | Fluoranthene               |                        | 770     | ND        |        |       | T    |          |   |
| 91-20-3  | Naphthalene                 | 770    | ND    | T         | 129-00-0                   | Pyrene                 | 770     | ND        |        |       | T    |          |   |
| 106-47-8 | 4-Chloroaniline             | 770    | ND    | 85-68-7   | Butylbenzylphthalate       |                        | 770     | ND        |        |       |      |          |   |
| 87-68-3  | Hexachlorobutadiene         | 770    | ND    | 92-87-5   | Benzidine                  |                        | 770     | ND        |        |       |      |          |   |
| 59-50-7  | 4-Chloro-3-methylphenol     | 770    | ND    | 91-94-1   | 3,3-Dichlorobenzidine      |                        | 770     | ND        |        |       |      |          |   |
| 91-57-6  | 2-Methylnaphthalene         | 770    | ND    | T         | 56-55-3                    | Benzo(a)anthracene     | 770     | ND        |        |       | T    |          |   |
| 77-47-4  | Hexachlorocyclopentadiene   | 770    | ND    | 218-01-9  | Chrysene                   |                        | 770     | ND        |        |       | T    |          |   |
| 88-06-2  | 2,4,6-Trichlorophenol       | 770    | ND    | 117-81-7  | bis(2-Ethylhexyl)phthalate |                        | 770     | ND        |        |       |      |          |   |
| 95-95-4  | 2,4,5-Trichlorophenol       | 3800   | ND    | 117-84-0  | Di-n-octylphthalate        |                        | 770     | ND        |        |       |      |          |   |
| 91-58-7  | 2-Chloronaphthalene         | 770    | ND    | 205-99-2  | Benzo(b)fluoranthene       |                        | 770     | ND        |        |       | T    |          |   |
| 88-74-4  | 2-Nitroaniline              | 3800   | ND    | 207-08-9  | Benzo(k)fluoranthene       |                        | 770     | ND        |        |       | T    |          |   |
| 131-11-3 | Dimethylphthalate           | 770    | ND    | 50-32-8   | Benzo(a)pyrene             |                        | 770     | ND        |        |       |      |          |   |
| 208-96-8 | Acenaphthylene              | 770    | ND    | T         | 193-39-5                   | Indeno(1,2,3-cd)pyrene | 770     | ND        |        |       |      |          |   |
| 606-20-2 | 2,6-Dinitrotoluene          | 770    | ND    | 53-70-3   | Dibenz(a,h)anthracene      |                        | 770     | ND        |        |       |      |          |   |
| 62-75-9  | N-Nitrosodimethylamine      | 770    | ND    | 191-24-2  | Benzo(g,h,i)perylene       |                        | 770     | ND        |        |       |      |          |   |

Project #: 903201

ug/Kg on a dry weight basis

ND: Denotes less than stated quantitative detection limit

Q: Qualifier: B: Denotes present in blank

T: Denotes trace level detected

## CHEMALYSIS INCORPORATED

PESTICIDE/PCB ANALYSIS RESULTS  
EPA Method 8080

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|              |                              |                 |          |
|--------------|------------------------------|-----------------|----------|
| Client:      | Baltimore Corps of Engineers | Lab ID:         | 9004309  |
| Client ID:   | #1                           | Date Sampled:   | 09/16/90 |
| Location:    | Alexandria Waterfront        | Time Sampled:   | 10:01 AM |
| Water Depth: | 24 Ft.                       | Moisture(%):    | 57       |
| Matrix:      | Sediment Core                | Date Extracted: | 09/19/90 |
| Units:       | ug/Kg (dry weight)           | Date Analyzed:  | 09/20/90 |

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| CAS Number | Parameter           | Quantitative    | Concentration Detected |
|------------|---------------------|-----------------|------------------------|
|            |                     | Detection Limit |                        |
| 319-84-6   | alpha-BHC           | 2.3             | ND                     |
| 319-85-7   | beta-BHC            | 2.3             | ND                     |
| 318-86-8   | delta-BHC           | 2.3             | ND                     |
| 58-89-9    | gamma-BHC (Lindane) | 2.3             | ND                     |
| 76-64-8    | Heptachlor          | 2.3             | ND                     |
| 309-00-2   | Aldrin              | 2.3             | ND                     |
| 1026-57-3  | Heptachlor epoxide  | 2.3             | ND                     |
| 959-98-8   | Endosulfan I        | 2.3             | ND                     |
| 60-57-1    | Dieldrin            | 2.3             | ND                     |
| 72-55-9    | 4,4'-DDE            | 2.3             | ND                     |
| 72-20-8    | Endrin              | 2.3             | ND                     |
| 7421-93-4  | Endrin aldehyde     | 2.3             | ND                     |
| 33213-65-9 | Endosulfan II       | 2.3             | ND                     |
| 72-54-8    | 4,4'-DDD            | 2.3             | ND                     |
| 1031-07-8  | Endosulfan sulfate  | 2.3             | ND                     |
| 50-29-3    | 4,4'-DDT            | 2.3             | ND                     |
| 57-74-9    | Technical Chlordane | 19              | ND                     |
| 8001-35-2  | Toxaphene           | 116             | ND                     |
| 12674-11-2 | PCB-1016            | 23              | ND                     |
| 11104-28-2 | PCB-1221            | 23              | ND                     |
| 11141-16-5 | PCB-1232            | 23              | ND                     |
| 53469-21-9 | PCB-1242            | 23              | ND                     |
| 12672-29-6 | PCB-1248            | 23              | ND                     |
| 11097-69-1 | PCB-1254            | 23              | ND                     |
| 11096-82-5 | PCB-1260            | 23              | ND                     |

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Project #: 903201

ND: Denotes less than stated quantitative detection limit

## CHEMALYSIS INCORPORATED

## CHEMICAL ANALYSIS RESULTS

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|              |                              |               |                    |
|--------------|------------------------------|---------------|--------------------|
| Client:      | Baltimore Corps of Engineers | Lab ID:       | 9004309            |
| Client ID:   | #1                           | Date Sampled: | 09/16/90           |
| Location:    | Alexandria Waterfront        | Time Sampled: | 10:01 AM           |
| Water Depth: | 24 Ft.                       | Moisture(%):  | 57                 |
| Matrix:      | Sediment Core                | Units:        | mg/kg (dry weight) |

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| CAS Number | Parameter               | EPA              | Quantitative       | Concentration<br>Detected |
|------------|-------------------------|------------------|--------------------|---------------------------|
|            |                         | Method<br>Number | Detection<br>Limit |                           |
| 7440-36-0  | Antimony                | 7041             | 2.3                | ND                        |
| 7440-38-2  | Arsenic                 | 7060             | 1.2                | 8.0                       |
| 7440-41-7  | Beryllium               | 7090             | 2.3                | ND                        |
| 7440-43-9  | Cadmium                 | 7130             | 1.2                | 4.1                       |
| 7440-47-3  | Chromium                | 7190             | 2.3                | 43.1                      |
| 7440-50-8  | Copper                  | 7210             | 5.8                | 49.4                      |
| 7440-92-1  | Lead                    | 7420             | 23                 | 51.5                      |
| 7439-97-6  | Mercury                 | 7471             | 0.2                | 0.4                       |
| 7440-02-0  | Nickel                  | 7520             | 9.3                | 49.0                      |
| 7882-49-2  | Selenium                | 7740             | 1.2                | 1.5                       |
| 7440-22-4  | Silver                  | 7760             | 2.3                | 8.6                       |
| 7440-28-0  | Thallium                | 7841             | 2.3                | ND                        |
| 7440-66-6  | Zinc                    | 7950             | 4.7                | 205                       |
|            | Cyanides                | 9010             | 0.2                | ND                        |
|            | Phenols                 | 9065             | 5.8                | ND                        |
|            | Chemical Oxygen Demand  | 410.1            | 2.3 %              | 72 %                      |
|            | Oil and Grease          | 413.2/3550       | 2.3                | ND                        |
|            | Total Kjeldahl Nitrogen | 3-201*           | 2.3                | 488                       |
|            | Ammonia Nitrogen        | 3-155*           |                    |                           |
|            | Nitrate Nitrogen        | 3-159*           |                    |                           |
|            | Total Phosphorus        | 3-232*           | 4.7                | 2420                      |
|            | Total Organic Carbon    | Walkley-Black    | 1 %                | 5%                        |
|            | Volatile Solids         | 2540G            | 1 %                | 0%                        |

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Project #: 9032J1

ND: Denotes less than stated quantitative detection limit

\*: Russell H. Plumb, May 1981

## CHEMALYSIS INCORPORATED

PESTICIDE/PCB ANALYSIS RESULTS  
EPA Method 8080

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|              |                              |                 |          |
|--------------|------------------------------|-----------------|----------|
| Client:      | Baltimore Corps of Engineers | Lab ID:         | 9004310  |
| Client ID:   | #2                           | Date Sampled:   | 09/16/90 |
| Location:    | Alexandria Waterfront        | Time Sampled:   | 10:15 AM |
| Water Depth: | 20 Ft.                       | Moisture(%):    | 49       |
| Matrix:      | Sediment Core                | Date Extracted: | 09/19/90 |
| Units:       | ug/Kg (dry weight)           | Date Analyzed:  | 09/20/90 |

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| CAS Number | Parameter           | Quantitative<br>Detection<br>Limit | Concentration<br>Detected |
|------------|---------------------|------------------------------------|---------------------------|
| 319-84-6   | alpha-BHC           | -----                              | -----                     |
| 319-85-7   | beta-BHC            | -----                              | -----                     |
| 318-86-8   | delta-BHC           | -----                              | -----                     |
| 58-89-9    | gamma-BHC (Lindane) | -----                              | -----                     |
| 76-44-8    | Heptachlor          | -----                              | -----                     |
| 309-00-2   | Aldrin              | -----                              | -----                     |
| 1024-57-3  | Heptachlor epoxide  | -----                              | -----                     |
| 959-98-8   | Endosulfan I        | -----                              | -----                     |
| 60-57-1    | Dieldrin            | -----                              | -----                     |
| 72-55-9    | 4,4'-DDO            | -----                              | -----                     |
| 72-20-8    | Endrin              | -----                              | -----                     |
| 7421-93-4  | Endrin aldehyde     | -----                              | -----                     |
| 33213-65-9 | Endosulfan II       | -----                              | -----                     |
| 72-54-8    | 4,4'-DDD            | -----                              | -----                     |
| 1031-07-8  | Endosulfan sulfate  | -----                              | -----                     |
| 50-29-3    | 4,4'-DDT            | -----                              | -----                     |
| 57-74-9    | Technical Chlordane | 16                                 | ND                        |
| 8001-35-2  | Toxaphene           | -----                              | -----                     |
| 12674-11-2 | PCB-1016            | 20                                 | ND                        |
| 11104-28-2 | PCB-1221            | 20                                 | ND                        |
| 11141-16-5 | PCB-1232            | 20                                 | ND                        |
| 53469-21-9 | PCB-1242            | 20                                 | ND                        |
| 12672-29-6 | PCB-1248            | 20                                 | ND                        |
| 11097-69-1 | PCB-1254            | 20                                 | ND                        |
| 11096-82-5 | PCB-1260            | 20                                 | ND                        |

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Project #: 903201

ND: Denotes less than stated quantitative detection limit

## CHEMALYSIS INCORPORATED

## CHEMICAL ANALYSIS RESULTS

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|              |                              |               |                    |
|--------------|------------------------------|---------------|--------------------|
| Client:      | Baltimore Corps of Engineers | Lab ID:       | 9004310            |
| Client ID:   | #2                           | Date Sampled: | 09/16/90           |
| Location:    | Alexandria Waterfront        | Time Sampled: | 10:15 AM           |
| Water Depth: | 20 Ft.                       | Moisture(%):  | 49                 |
| Matrix:      | Sediment Core                | Units:        | mg/kg (dry weight) |

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| CAS Number | Parameter               | EPA              | Quantitative       |  | Concentration<br>Detected |
|------------|-------------------------|------------------|--------------------|--|---------------------------|
|            |                         | Method<br>Number | Detection<br>Limit |  |                           |
| 7440-36-0  | Antimony                | 7041             |                    |  |                           |
| 7440-38-2  | Arsenic                 | 7060             |                    |  |                           |
| 7440-41-7  | Beryllium               | 7090             |                    |  |                           |
| 7440-43-9  | Cadmium                 | 7130             | 1.0                |  | 3.4                       |
| 7440-47-3  | Chromium                | 7190             | 2.0                |  | 43.2                      |
| 7440-50-8  | Copper                  | 7210             | 4.9                |  | 48.5                      |
| 7440-92-1  | Lead                    | 7420             |                    |  |                           |
| 7439-97-6  | Mercury                 | 7471             | 0.2                |  | 0.2                       |
| 7440-02-0  | Nickel                  | 7520             |                    |  |                           |
| 7882-49-2  | Selenium                | 7740             |                    |  |                           |
| 7440-22-4  | Silver                  | 7760             |                    |  |                           |
| 7440-28-0  | Thallium                | 7841             |                    |  |                           |
| 7440-66-6  | Zinc                    | 7950             | 3.9                |  | 229                       |
|            | Cyanides                | 9010             | 0.2                |  | ND                        |
|            | Phenols                 | 9065             |                    |  |                           |
|            | Chemical Oxygen Demand  | 410.1            | 2.0 %              |  | 88 %                      |
|            | Oil and Grease          | 413.2/3550       | 2.0                |  | ND                        |
|            | Total Kjeldahl Nitrogen | 3-201*           | 2.0                |  | 343                       |
|            | Ammonia Nitrogen        | 3-155*           |                    |  |                           |
|            | Nitrate Nitrogen        | 3-159*           |                    |  |                           |
|            | Total Phosphorus        | 3-232*           | 3.9                |  | 2240                      |
|            | Total Organic Carbon    | Walkley-Black    | 1 %                |  | 3 %                       |
|            | Volatile Solids         | 2540G            | 1 %                |  | 8.8 %                     |

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Project #: 903201

ND: Denotes less than stated quantitative detection limit

\*: Russell H. Plumb, May 1981

## CHEMALYSIS INCORPORATED

PESTICIDE/PCB ANALYSIS RESULTS  
EPA Method 8080

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|              |                              |                 |          |
|--------------|------------------------------|-----------------|----------|
| Client:      | Baltimore Corps of Engineers | Lab ID:         | 9004311  |
| Client ID:   | #3                           | Date Sampled:   | 09/16/90 |
| Location:    | Alexandria Waterfront        | Time Sampled:   | 10:40 AM |
| Water Depth: | 24 Ft.                       | Moisture(%):    | 52       |
| Matrix:      | Sediment Core                | Date Extracted: | 09/19/90 |
| Units:       | ug/Kg (dry weight)           | Date Analyzed:  | 09/20/90 |

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| CAS Number | Parameter           | Quantitative    |                        |
|------------|---------------------|-----------------|------------------------|
|            |                     | Detection Limit | Concentration Detected |
| 319-84-6   | alpha-BHC           | -----           | -----                  |
| 319-85-7   | beta-BHC            | -----           | -----                  |
| 318-86-8   | delta-BHC           | -----           | -----                  |
| 58-89-9    | gamma-BHC (Lindane) | -----           | -----                  |
| 76-64-8    | Heptachlor          | -----           | -----                  |
| 309-00-2   | Aldrin              | -----           | -----                  |
| 1024-57-3  | Heptachlor epoxide  | -----           | -----                  |
| 959-98-8   | Endosulfan I        | -----           | -----                  |
| 60-57-1    | Dieldrin            | -----           | -----                  |
| 72-55-9    | 4,4'-DDE            | -----           | -----                  |
| 72-20-8    | Endrin              | -----           | -----                  |
| 7421-93-4  | Endrin aldehyde     | -----           | -----                  |
| 33213-65-9 | Endosulfan II       | -----           | -----                  |
| 72-54-8    | 4,4'-DDD            | -----           | -----                  |
| 1031-07-8  | Endosulfan sulfate  | -----           | -----                  |
| 50-29-3    | 4,4'-DDT            | -----           | -----                  |
| 57-74-9    | Technical Chlordane | 17              | ND                     |
| 8001-35-2  | Toxaphene           | -----           | -----                  |
| 12674-11-2 | PCB-1016            | 21              | ND                     |
| 11104-28-2 | PCB-1221            | 21              | ND                     |
| 11141-16-5 | PCB-1232            | 21              | ND                     |
| 53469-21-9 | PCB-1242            | 21              | ND                     |
| 12672-29-6 | PCB-1248            | 21              | ND                     |
| 11097-69-1 | PCB-1254            | 21              | ND                     |
| 11096-82-5 | PCB-1260            | 21              | ND                     |

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Project #: 903201

ND: Denotes less than stated quantitative detection limit

## CHEMALYSIS INCORPORATED

## CHEMICAL ANALYSIS RESULTS

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|              |                              |               |                    |
|--------------|------------------------------|---------------|--------------------|
| Client:      | Baltimore Corps of Engineers | Lab ID:       | 9004311            |
| Client ID:   | #3                           | Date Sampled: | 09/16/90           |
| Location:    | Alexandria Waterfront        | Time Sampled: | 10:40 AM           |
| Water Depth: | 24 Ft.                       | Moisture(%):  | 52                 |
| Matrix:      | Sediment Core                | Units:        | mg/kg (dry weight) |

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| CAS Number | Parameter               | EPA Method Number | Quantitative Detection Limit | Concentration Detected |
|------------|-------------------------|-------------------|------------------------------|------------------------|
| 7440-36-0  | Antimony                | 7041              |                              |                        |
| 7440-38-2  | Arsenic                 | 7060              |                              |                        |
| 7440-41-7  | Beryllium               | 7090              |                              |                        |
| 7440-43-9  | Cadmium                 | 7130              | 1.0                          | 4.0                    |
| 7440-47-3  | Chromium                | 7190              | 2.1                          | 57.1                   |
| 7440-50-8  | Copper                  | 7210              | 5.2                          | 53.2                   |
| 7440-92-1  | Lead                    | 7420              |                              |                        |
| 7439-97-6  | Mercury                 | 7471              | 0.2                          | 0.3                    |
| 7460-02-0  | Nickel                  | 7520              |                              |                        |
| 7882-49-2  | Selenium                | 7740              |                              |                        |
| 7440-22-4  | Silver                  | 7760              |                              |                        |
| 7440-28-0  | Thallium                | 7841              |                              |                        |
| 7440-66-6  | Zinc                    | 7950              | 4.2                          | 256                    |
|            | Cyanides                | 9010              | 0.2                          | ND                     |
|            | Phenols                 | 9065              |                              |                        |
|            | Chemical Oxygen Demand  | 410.1             | 2.1 %                        | 71 %                   |
|            | Oil and Grease          | 413.2/3550        | 2.1                          | ND                     |
|            | Total Kjeldahl Nitrogen | 3-201*            | 2.1                          | 313                    |
|            | Ammonia Nitrogen        | 3-155*            |                              |                        |
|            | Nitrate Nitrogen        | 3-159*            |                              |                        |
|            | Total Phosphorus        | 3-232*            | 4.2                          | 3080                   |
|            | Total Organic Carbon    | Walkley-Black     | 1 %                          | 3 %                    |
|            | Volatile Solids         | 2540G             | 1 %                          | 7.8 %                  |

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Project #: 903201

ND: Denotes less than stated quantitative detection limit

\*: Russell H. Plumb, May 1981

## CHEMALYSIS INCORPORATED

VOLATILE ORGANIC ANALYSIS RESULTS  
EPA Method 8240

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|              |                              |                |          |
|--------------|------------------------------|----------------|----------|
| Client:      | Baltimore Corps of Engineers | Lab ID:        | 9004313  |
| Client ID:   | #5                           | Date Sampled:  | 09/16/90 |
| Location:    | Alexandria Waterfront        | Time Sampled:  | 09:00AM  |
| Water Depth: | 23 Ft                        | Moisture(%):   | 50       |
| Matrix:      | Sediment Core                | Date Analyzed: | 09/18/90 |

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| CAS Number | Parameter                  | Quantitative Detection |               |
|------------|----------------------------|------------------------|---------------|
|            |                            | Limit, ug/Kg           | Concentration |
| 74-87-3    | Chloromethane              | 400                    | ND            |
| 74-83-9    | Bromomethane               | 400                    | ND            |
| 75-01-4    | Vinyl Chloride             | 400                    | ND            |
| 75-00-3    | Chloroethane               | 400                    | ND            |
| 75-09-2    | Methylene Chloride         | 200                    | ND            |
| 67-64-1    | Acetone                    | 400                    | 650 B         |
| 75-15-0    | Carbon Disulfide           | 200                    | ND            |
| 75-69-6    | Trichlorofluoromethane     | 400                    | ND            |
| 75-35-4    | 1,1-Dichloroethene         | 200                    | ND            |
| 75-34-3    | 1,1-Dichloroethane         | 200                    | ND            |
| 540-59-0   | 1,2-Dichloroethene (total) | 200                    | ND            |
| 67-66-3    | Chloroform                 | 200                    | ND            |
| 107-06-2   | 1,2-Dichloroethane         | 200                    | ND            |
| 78-93-3    | 2-Butanone                 | 400                    | ND            |
| 71-55-6    | 1,1,1-Trichloroethane      | 200                    | ND            |
| 56-23-5    | Carbon Tetrachloride       | 200                    | ND            |
| 108-05-4   | Vinyl Acetate              | 400                    | ND            |
| 75-27-4    | Bromodichloromethane       | 200                    | ND            |
| 78-87-5    | 1,2-Dichloropropane        | 200                    | ND            |
| 10061-02-6 | trans-1,3-Dichloropropene  | 200                    | ND            |
| 79-01-6    | Trichloroethene            | 200                    | ND            |
| 124-48-1   | Dibromochloromethane       | 200                    | ND            |
| 79-00-5    | 1,1,2-Trichloroethane      | 200                    | ND            |
| 71-43-2    | Benzene                    | 200                    | ND            |
| 10061-01-5 | cis-1,3-Dichloropropene    | 200                    | ND            |
| 110-75-8   | 2-Chloroethylvinyl ether   | 400                    | ND            |
| 75-25-2    | Bromoform                  | 200                    | ND            |
| 591-78-6   | 2-Hexanone                 | 400                    | ND            |
| 108-10-1   | 4-Methyl-2-pentanone       | 400                    | ND            |
| 127-18-4   | Tetrachloroethene          | 200                    | ND            |
| 79-34-5    | 1,1,2,2-Tetrachloroethane  | 200                    | ND            |
| 108-88-3   | Toluene                    | 200                    | ND            |
| 108-90-7   | Chlorobenzene              | 200                    | ND            |
| 100-41-4   | Ethylbenzene               | 200                    | ND            |
| 100-42-5   | Styrene                    | 200                    | ND            |
| 1330-20-7  | Total Xylenes              | 200                    | ND            |

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Project #: 903201 ug/Kg on Dry Weight Basis

ND: Denotes less than stated quantitative detection limit

Q: Qualifier: B: Denotes present in blank

T: Denotes trace level detected

## CHEMALYSIS INCORPORATED

SEMOVOLATILE ANALYSIS RESULTS  
EPA Method 8270

|            |                              |                 |          |
|------------|------------------------------|-----------------|----------|
| Client:    | Baltimore Corps of Engineers | Lab ID:         | 9004313  |
| Client ID: | #5                           | Date Sampled:   | 09/16/90 |
| Location:  | Alexandria Waterfront        | Time Sampled:   | 09:00AM  |
| Depth:     | Water - 23 Ft                | Moisture (%):   | 50       |
| Matrix:    | Sediment Core                | Date Extracted: | 09/18/90 |
| Units:     | ug/Kg                        | Date Analyzed:  | 09/19/90 |

| CAS No.  | Parameter                    | Quant. | Conc.    | D.L.      | Detected                   | Q                      | CAS No. | Parameter | Quant. | Conc.    |   |
|----------|------------------------------|--------|----------|-----------|----------------------------|------------------------|---------|-----------|--------|----------|---|
|          |                              | D.L.   | Detected |           |                            |                        |         |           | D.L.   | Detected | Q |
| 108-95-2 | Phenol                       | 660    | ND       | 122-66-7  | 1,2-Diphenylhydrazine      |                        | 660     |           | ND     |          |   |
| 111-44-4 | bis(2-Chloroethyl)ether      | 660    | ND       | 99-09-2   | 3-Nitroaniline             |                        | 3300    |           | ND     |          |   |
| 95-57-8  | 2-Chlorophenol               | 660    | ND       | 13-32-9   | Acenaphthene               |                        | 660     |           | ND     |          | T |
| 541-73-1 | 1,3-Dichlorobenzene          | 660    | ND       | 51-28-5   | 2,4-Dinitrophenol          |                        | 3300    |           | ND     |          |   |
| 106-46-7 | 1,4-Dichlorobenzene          | 660    | ND       | 100-02-7  | 4-Nitrophenol              |                        | 3300    |           | ND     |          |   |
| 100-51-6 | Benzyl alcohol               | 660    | ND       | 132-64-9  | Dibenzofuran               |                        | 660     |           | ND     |          |   |
| 95-50-1  | 1,2-Dichlorobenzene          | 660    | ND       | 121-14-2  | 2,4-Dinitrotoluene         |                        | 660     |           | ND     |          |   |
| 95-48-7  | 2-Methylphenol               | 660    | ND       | 84-66-2   | Diethylphthalate           |                        | 660     |           | ND     |          |   |
| 108-60-1 | bis(2-Chloroisopropyl)ether  | 660    | ND       | 7005-72-3 | 4-Chlorophenyl-phenylether |                        | 660     |           | ND     |          |   |
| 106-44-5 | 4-Methylphenol               | 660    | ND       | 86-73-7   | Fluorene                   |                        | 660     |           | ND     |          | T |
| 621-64-7 | N-Nitroso-di-n-dipropylamine | 660    | ND       | 100-01-6  | 4-Nitroaniline             |                        | 3300    |           | ND     |          |   |
| 67-72-1  | Hexachloroethane             | 660    | ND       | 534-52-1  | 4,6-Dinitro-2-methylphenol |                        | 3300    |           | ND     |          |   |
| 98-95-3  | Nitrobenzene                 | 660    | ND       | 86-30-6   | N-Nitrosodiphenylamine     |                        | 660     |           | ND     |          |   |
| 78-59-1  | Isophorone                   | 660    | ND       | 101-55-3  | 4-Bromophenyl-phenylether  |                        | 660     |           | ND     |          |   |
| 88-75-5  | 2-Nitrophenol                | 660    | ND       | 118-74-1  | Hexachlorobenzene          |                        | 660     |           | ND     |          |   |
| 105-67-9 | 2,4-Dimethylphenol           | 660    | ND       | 87-86-5   | Pentachlorophenol          |                        | 3300    |           | ND     |          |   |
| 65-85-0  | Benzoic acid                 | 3300   | ND       | 85-01-8   | Phanthrene                 |                        | 660     |           | ND     |          | T |
| 111-91-1 | bis(2-Chloroethoxy)methane   | 660    | ND       | 120-12-7  | Anthracene                 |                        | 660     |           | ND     |          | T |
| 120-83-2 | 2,4-Dichlorophenol           | 660    | ND       | 84-74-2   | Di-n-butylphthalate        |                        | 660     |           | ND     |          |   |
| 120-82-1 | 1,2,4-Trichlorobenzene       | 660    | ND       | 206-44-0  | Fluoranthene               |                        | 660     |           | ND     |          | T |
| 91-20-3  | Naphthalene                  | 660    | ND       | T         | 129-00-0                   | Pyrene                 |         | 660       |        | ND       | T |
| 106-47-8 | 4-Chloroaniline              | 660    | ND       | 85-68-7   | Butylbenzylphthalate       |                        | 660     |           | ND     |          |   |
| 87-68-3  | Hexachlorobutadiene          | 660    | ND       | 92-87-5   | Benzidine                  |                        | 660     |           | ND     |          |   |
| 59-50-7  | 4-Chloro-3-methylphenol      | 660    | ND       | 91-94-1   | 3,3-Dichlorobenzidine      |                        | 660     |           | ND     |          |   |
| 91-57-6  | 2-Methylnaphthalene          | 660    | ND       | T         | 56-55-3                    | Benzo(a)anthracene     |         | 660       |        | ND       |   |
| 77-47-4  | Hexachlorocyclopentadiene    | 660    | ND       | 218-01-9  | Chrysene                   |                        | 660     |           | ND     |          |   |
| 88-06-2  | 2,4,6-Trichlorophenol        | 660    | ND       | 117-81-7  | bis(2-Ethylhexyl)phthalate |                        | 660     |           | ND     |          |   |
| 95-95-4  | 2,4,5-Trichlorophenol        | 3300   | ND       | 117-84-0  | Di-n-octylphthalate        |                        | 660     |           | ND     |          |   |
| 91-58-7  | 2-Chloronaphthalene          | 660    | ND       | 205-99-2  | Benzo(b)fluoranthene       |                        | 660     |           | ND     |          | T |
| 88-74-4  | 2-Nitroaniline               | 3300   | ND       | 207-08-9  | Benzo(k)fluoranthene       |                        | 660     |           | ND     |          | T |
| 131-11-3 | Dimethylphthalate            | 660    | ND       | 50-32-8   | Benzo(a)pyrene             |                        | 660     |           | ND     |          | T |
| 208-96-8 | Acenaphthylene               | 660    | ND       | T         | 193-39-5                   | Indeno(1,2,3-cd)pyrene |         | 660       |        | ND       |   |
| 606-20-2 | 2,6-Dinitrotoluene           | 660    | ND       | 53-70-3   | Dibenz(a,h)anthracene      |                        | 660     |           | ND     |          |   |
| 62-75-9  | N-Nitrosodimethylamine       | 660    | ND       | 191-24-2  | Benzo(g,h,i)perylene       |                        | 660     |           | ND     |          |   |

Project #: 903201

ug/Kg on a dry weight basis

ND: Denotes less than stated quantitative detection limit

Q: Qualifier: B: Denotes present in blank

T: Denotes trace level detected

## CHEMALYSIS INCORPORATED

PESTICIDE/PCB ANALYSIS RESULTS  
EPA Method 8080

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|              |                              |                 |          |
|--------------|------------------------------|-----------------|----------|
| Client:      | Baltimore Corps of Engineers | Lab ID:         | 9004313  |
| Client ID:   | #5                           | Date Sampled:   | 09/16/90 |
| Location:    | Alexandria Waterfront        | Time Sampled:   | 9:00 AM  |
| Water Depth: | 23 Ft.                       | Moisture(%):    | 50       |
| Matrix:      | Sediment Core                | Date Extracted: | 09/19/90 |
| Units:       | ug/Kg (dry weight)           | Date Analyzed:  | 09/20/90 |

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| CAS Number | Parameter           | Quantitative       | Concentration<br>Detected |
|------------|---------------------|--------------------|---------------------------|
|            |                     | Detection<br>Limit |                           |
| 319-84-6   | alpha-BHC           | 2.0                | ND                        |
| 319-85-7   | beta-BHC            | 2.0                | ND                        |
| 318-86-8   | delta-BHC           | 2.0                | ND                        |
| 58-89-9    | gamma-BHC (Lindane) | 2.0                | ND                        |
| 76-44-8    | Heptachlor          | 2.0                | ND                        |
| 309-00-2   | Aldrin              | 2.0                | ND                        |
| 1024-57-3  | Heptachlor epoxide  | 2.0                | ND                        |
| 959-98-8   | Endosulfan I        | 2.0                | ND                        |
| 60-57-1    | Dieldrin            | 2.0                | ND                        |
| 72-55-9    | 4,4'-DDT            | 2.0                | ND                        |
| 72-20-8    | Endrin              | 2.0                | ND                        |
| 7421-93-4  | Endrin aldehyde     | 2.0                | ND                        |
| 33213-65-9 | Endosulfan II       | 2.0                | ND                        |
| 72-54-8    | 4,4'-DDD            | 2.0                | ND                        |
| 1031-07-8  | Endosulfan sulfate  | 2.0                | ND                        |
| 50-29-3    | 4,4'-DDT            | 2.0                | ND                        |
| 57-74-9    | Technical Chlordane | 16                 | ND                        |
| 8001-35-2  | Toxaphene           | 100                | ND                        |
| 12674-11-2 | PCB-1016            | 20                 | ND                        |
| 11104-28-2 | PCB-1221            | 20                 | ND                        |
| 11141-16-5 | PCB-1232            | 20                 | ND                        |
| 53469-21-9 | PCB-1242            | 20                 | ND                        |
| 12672-29-6 | PCB-1248            | 20                 | ND                        |
| 11097-69-1 | PCB-1254            | 20                 | ND                        |
| 11096-82-5 | PCP 1260            | 20                 | ND                        |

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Project #: 903201

ND: Denotes less than stated quantitative detection limit

## CHEMALYSIS INCORPORATED

## CHEMICAL ANALYSIS RESULTS

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|              |                              |               |                    |
|--------------|------------------------------|---------------|--------------------|
| Client:      | Baltimore Corps of Engineers | Lab ID:       | 9004313            |
| Client ID:   | #5                           | Date Sampled: | 09/16/90           |
| Location:    | Alexandria Waterfront        | Time Sampled: | 9:00 AM            |
| Water Depth: | 23 Ft.                       | Moisture(%):  | 50                 |
| Matrix:      | Sediment Core                | Units:        | mg/kg (dry weight) |

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| CAS Number | Parameter               | EPA Method Number | Quantitative Detection Limit | Concentration Detected |
|------------|-------------------------|-------------------|------------------------------|------------------------|
| 7440-36-0  | Antimony                | 7041              | 2.0                          | ND                     |
| 7440-38-2  | Arsenic                 | 7060              | 1.0                          | 6.8                    |
| 7440-41-7  | Beryllium               | 7090              | 2.0                          | ND                     |
| 7440-43-9  | Cadmium                 | 7130              | 1.0                          | 3.5                    |
| 7440-47-3  | Chromium                | 7190              | 2.0                          | 49.0                   |
| 7440-50-8  | Copper                  | 7210              | 5.0                          | 49.0                   |
| 7440-92-1  | Lead                    | 7420              | 20                           | 67.0                   |
| 7439-97-6  | Mercury                 | 7471              | 0.2                          | 0.3                    |
| 7440-02-0  | Nickel                  | 7520              | 8.0                          | 47.7                   |
| 7882-49-2  | Selenium                | 7740              | 1.0                          | 1.3                    |
| 7440-22-4  | Silver                  | 7760              | 2.0                          | 6.2                    |
| 7440-28-0  | Thallium                | 7841              | 2.0                          | ND                     |
| 7440-66-6  | Zinc                    | 7950              | 4.0                          | 240                    |
|            | Cyanides                | 9010              | 0.2                          | 0.6                    |
|            | Phenols                 | 9065              | 5.0                          | ND                     |
|            | Chemical Oxygen Demand  | 410.1             | 2.0 %                        | 64 %                   |
|            | Oil and Grease          | 413.2/3550        | 2.0                          | ND                     |
|            | Total Kjeldahl Nitrogen | 3-201*            | 2.0                          | 350                    |
|            | Ammonia Nitrogen        | 3-155*            |                              |                        |
|            | Nitrate Nitrogen        | 3-159*            |                              |                        |
|            | Total Phosphorus        | 3-232*            | 4.0                          | 1400                   |
|            | Total Organic Carbon    | Walkley-Black     | 1 %                          | 3 %                    |
|            | Volatile Solids         | 2540G             | 1 %                          | 6.3 %                  |

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Project #: 903201

ND: Denotes less than stated quantitative detection limit

\*: Russell H. Plumb, May 1981

## CHEMALYSIS INCORPORATED

## CHEMICAL ANALYSIS RESULTS

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|              |                              |               |                    |
|--------------|------------------------------|---------------|--------------------|
| Client:      | Baltimore Corps of Engineers | Lab ID:       | 9004322            |
| Client ID:   | Comp. A (#1,2,3,5)           | Date Sampled: | 09/16/90           |
| Location:    | Alexandria Waterfront        | Time Sampled: | 9:00-10:40 AM      |
| Water Depth: | 20-24 Ft.                    | Moisture(%):  | 54                 |
| Matrix:      | Leachate                     | Units:        | mg/kg (dry weight) |

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| CAS Number | Parameter               | EPA Method Number | Quantitative Detection Limit | Concentration Detected |
|------------|-------------------------|-------------------|------------------------------|------------------------|
| 7440-36-0  | Antimony                | 7041              |                              |                        |
| 7440-38-2  | Arsenic                 | 7060              |                              |                        |
| 7440-41-7  | Beryllium               | 7090              |                              |                        |
| 7440-43-9  | Cadmium                 | 7130              |                              |                        |
| 7440-47-3  | Chromium                | 7190              |                              |                        |
| 7440-50-8  | Copper                  | 7210              |                              |                        |
| 7440-92-1  | Lead                    | 7420              |                              |                        |
| 7439-97-6  | Mercury                 | 7471              |                              |                        |
| 7440-02-0  | Nickel                  | 7520              |                              |                        |
| 7882-49-2  | Selenium                | 7740              |                              |                        |
| 7440-22-4  | Silver                  | 7760              |                              |                        |
| 7440-28-0  | Thallium                | 7841              |                              |                        |
| 7440-66-6  | Zinc                    | 7950              |                              |                        |
|            | Cyanides                | 9010              |                              |                        |
|            | Phenols                 | 9065              |                              |                        |
|            | Chemical Oxygen Demand  | 410.1             |                              |                        |
|            | Oil and Grease          | 413.2/3550        |                              |                        |
|            | Total Kjeldahl Nitrogen | 3-201*            |                              |                        |
|            | Ammonia Nitrogen        | 3-155*            | 2.2                          | 141                    |
|            | Nitrate Nitrogen        | 3-159*            | 2.2                          | ND                     |
|            | Total Phosphorus        | 3-232*            |                              |                        |
|            | Total Organic Carbon    | Walkley-Black     |                              |                        |
|            | Volatile Solids         | 2540G             |                              |                        |

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Project #: 903201

ND: Denotes less than stated quantitative detection limit

\*: Russell H. Plumb, May 1981

## CHEMALYSIS INCORPORATED

## EP TOX ANALYSIS RESULTS

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|              |                              |               |               |
|--------------|------------------------------|---------------|---------------|
| Client:      | Baltimore Corps of Engineers | Lab ID:       | 9004322       |
| Client ID:   | Comp. A (#1,2,3,5)           | Date Sampled: | 09/16/90      |
| Location:    | Alexandria Waterfront        | Time Sampled: | 9:00-10:40 AM |
| Water Depth: | 20-24 Ft.                    | Units:        | mg/l          |
| Matrix:      | Leachate                     |               |               |

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| CAS Number | Parameter           | EPA           | Quantitative    |                        | RCRA          |
|------------|---------------------|---------------|-----------------|------------------------|---------------|
|            |                     | Method Number | Detection Limit | Concentration Detected | Ep Tox Limit* |
| 72-20-8    | Endrin              | 608           | 0.00005         | ND                     | 0.02          |
| 58-89-9    | gamma-BHC (Lindane) | 608           | 0.00005         | ND                     | 0.4           |
| 72-43-5    | Methoxychlor        | 608           | 0.00025         | ND                     | 10.0          |
| 8001-35-2  | Toxaphene           | 608           | 0.0025          | ND                     | 0.5           |
| 94-75-7    | 2,4-D               | 615           | 0.0025          | ND                     | 10.0          |
| 93-72-1    | 2,4,5-TP (Silvex)   | 615           | 0.0025          | ND                     | 1.0           |
| 7440-38-2  | Arsenic             | 206.2         | 0.005           | 0.005                  | 5.0           |
| 7440-39-3  | Barium              | 208.1         | 0.50            | 2.50                   | 100.0         |
| 7440-43-9  | Cadmium             | 213.1         | 0.005           | 0.007                  | 1.0           |
| 7440-47-3  | Chromium            | 218.1         | 0.010           | 0.011                  | 5.0           |
| 7440-92-1  | Lead                | 239.1         | 0.10            | ND                     | 5.0           |
| 7439-97-6  | Mercury             | 245.1         | 0.0002          | ND                     | 0.2           |
| 7882-49-2  | Selenium            | 270.2         | 0.005           | ND                     | 1.0           |
| 7440-22-4  | Silver              | 272.1         | 0.010           | ND                     | 5.0           |

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Project #: 903201

ND: Denotes less than stated quantitative detection limit

\*: Taken from the Federal Register, March 29, 1990, Toxicity Characteristics Revisions

## CHEMALYSIS INCORPORATED

VOLATILE ORGANIC ANALYSIS RESULTS  
EPA Method 8240

Client: Baltimore Corps of Engineers Lab ID: 9004323  
 Client ID: Composite B (#2,3) Date Sampled: 09/16/90  
 Location: Alexandria Waterfront Time Sampled: 10-11AM  
 Water Depth: 20-24 Ft Moisture(%): 51  
 Matrix: Sediment Core Date Analyzed: 09/18/90

| CAS Number | Parameter                  | Quantitative           |                               |
|------------|----------------------------|------------------------|-------------------------------|
|            |                            | Detection Limit, ug/Kg | Concentration Detected, ug/Kg |
| 74-87-3    | Chloromethane              | 410                    | ND                            |
| 74-83-9    | Bromomethane               | 410                    | ND                            |
| 75-01-4    | Vinyl Chloride             | 410                    | ND                            |
| 75-00-3    | Chloroethane               | 410                    | ND                            |
| 75-09-2    | Methylene Chloride         | 200                    | ND                            |
| 67-64-1    | Acetone                    | 410                    | ND                            |
| 75-15-0    | Carbon Disulfide           | 200                    | ND                            |
| 75-69-4    | Trichlorofluoromethane     | 410                    | ND                            |
| 75-35-4    | 1,1-Dichloroethene         | 200                    | ND                            |
| 75-34-3    | 1,1-Dichloroethane         | 200                    | ND                            |
| 540-59-0   | 1,2-Dichloroethene (total) | 200                    | ND                            |
| 67-66-3    | Chloroform                 | 200                    | ND                            |
| 107-06-2   | 1,2-Dichloroethane         | 200                    | ND                            |
| 78-93-3    | 2-Butanone                 | 410                    | ND                            |
| 71-55-6    | 1,1,1-Trichloroethane      | 200                    | ND                            |
| 56-23-5    | Carbon Tetrachloride       | 200                    | ND                            |
| 108-05-4   | Vinyl Acetate              | 410                    | ND                            |
| 75-27-4    | Bromodichloromethane       | 200                    | ND                            |
| 78-87-5    | 1,2-Dichloropropane        | 200                    | ND                            |
| 10061-02-6 | trans-1,3-Dichloropropene  | 200                    | ND                            |
| 79-01-6    | Trichloroethene            | 200                    | ND                            |
| 124-48-1   | Dibromochloromethane       | 200                    | ND                            |
| 79-00-5    | 1,1,2-Trichloroethane      | 200                    | ND                            |
| 71-43-2    | Benzene                    | 200                    | ND                            |
| 10061-01-5 | cis-1,3-Dichloropropene    | 200                    | ND                            |
| 110-75-8   | 2-Chloroethylvinyl ether   | 410                    | ND                            |
| 75-25-2    | Bromoform                  | 200                    | ND                            |
| 591-78-6   | 2-Hexanone                 | 410                    | ND                            |
| 108-10-1   | 4-Methyl-2-pentanone       | 410                    | ND                            |
| 127-18-4   | Tetrachloroethene          | 200                    | ND                            |
| 79-34-5    | 1,1,2,2-Tetrachloroethane  | 200                    | ND                            |
| 108-88-3   | Toluene                    | 200                    | ND                            |
| 108-90-7   | Chlorobenzene              | 200                    | ND                            |
| 100-41-4   | Ethylbenzene               | 200                    | ND                            |
| 100-42-5   | Styrene                    | 200                    | ND                            |
| 1330-20-7  | Total Xylenes              | 200                    | ND                            |

Project #: 903201 ug/Kg on Dry Weight Basis

ND: Denotes less than stated quantitative detection limit

Q: Qualifier: B: Denotes present in blank

T: Denotes trace level detected

## CHEMALYSIS INCORPORATED

SEMIVOLATILE ANALYSIS RESULTS  
EPA Method 8270

|            |                              |                 |          |
|------------|------------------------------|-----------------|----------|
| Client:    | Baltimore Corps of Engineers | Lab ID:         | 9004323  |
| Client ID: | Composite B (#2,3)           | Date Sampled:   | 09/16/90 |
| Location:  | Alexandria Waterfront        | Time Sampled:   | 10-11AM  |
| Depth:     | Water - 20 to 24 Ft          | Moisture (%):   | 51       |
| Matrix:    | Sediment Core                | Date Extracted: | 09/18/90 |
| Units:     | ug/Kg                        | Date Analyzed:  | 09/19/90 |

| CAS No.  | Parameter                    | Quant. | Conc.    | D.L.      | Detected                   | Q | CAS No. | Parameter | Quant. | Conc.    | D.L. | Detected | Q |
|----------|------------------------------|--------|----------|-----------|----------------------------|---|---------|-----------|--------|----------|------|----------|---|
|          |                              | D.L.   | Detected |           |                            |   |         |           | D.L.   | Detected |      |          |   |
| 108-95-2 | Phenol                       | 670    | ND       | 122-66-7  | 1,2-Diphenylhydrazine      |   | 670     | ND        | 670    | ND       |      |          |   |
| 111-44-4 | bis(2-Chloroethyl)ether      | 670    | ND       | 99-09-2   | 3-Nitroaniline             |   | 3400    | ND        |        |          |      |          |   |
| 95-57-8  | 2-Chlorophenol               | 670    | ND       | 83-32-9   | Acenaphthene               |   | 670     | ND        |        |          |      |          | T |
| 541-73-1 | 1,3-Dichlorobenzene          | 670    | ND       | 51-28-5   | 2,4-Dinitrophenol          |   | 3400    | ND        |        |          |      |          |   |
| 106-46-7 | 1,4-Dichlorobenzene          | 670    | ND       | 100-02-7  | 4-Nitrophenol              |   | 3400    | ND        |        |          |      |          |   |
| 100-51-6 | Benzyl alcohol               | 670    | ND       | 132-64-9  | Dibenzofuran               |   | 670     | ND        |        |          |      |          |   |
| 95-50-1  | 1,2-Dichlorobenzene          | 670    | ND       | 121-14-2  | 2,4-Dinitrotoluene         |   | 670     | ND        |        |          |      |          |   |
| 95-48-7  | 2-Methylphenol               | 670    | ND       | 84-66-2   | Diethylphthalate           |   | 670     | ND        |        |          |      |          |   |
| 108-60-1 | bis(2-Chloroisopropyl)ether  | 670    | ND       | 7005-72-3 | 4-Chlorophenyl-phenylether |   | 670     | ND        |        |          |      |          |   |
| 106-44-5 | 4-Methylphenol               | 670    | ND       | 86-73-7   | Fluorene                   |   | 670     | ND        |        |          |      |          | T |
| 621-64-7 | N-Nitroso-di-n-dipropylamine | 670    | ND       | 100-01-6  | 4-Nitroaniline             |   | 3400    | ND        |        |          |      |          |   |
| 67-72-1  | Hexachloroethane             | 670    | ND       | 534-52-1  | 4,6-Dinitro-2-methylphenol |   | 3400    | ND        |        |          |      |          |   |
| 98-95-3  | Nitrobenzene                 | 670    | ND       | 86-30-6   | N-Nitrosodiphenylamine     |   | 670     | ND        |        |          |      |          |   |
| 78-59-1  | Isophorone                   | 670    | ND       | 101-55-3  | 4-Bromophenyl-phenylether  |   | 670     | ND        |        |          |      |          |   |
| 88-75-5  | Z-Nitrophenol                | 670    | ND       | 118-74-1  | Hexachlorobenzene          |   | 670     | ND        |        |          |      |          |   |
| 105-67-9 | 2,4-Dimethylphenol           | 670    | ND       | 87-86-5   | Pentachlorophenol          |   | 3400    | ND        |        |          |      |          |   |
| 65-85-0  | Benzoic acid                 | 3400   | ND       | 85-01-8   | Phenanthrene               |   | 670     | ND        |        |          |      |          | T |
| 111-91-1 | bis(2-Chloroethoxy)methane   | 670    | ND       | 120-12-7  | Anthracene                 |   | 670     | ND        |        |          |      |          | T |
| 120-83-2 | 2,4-Dichlorophenol           | 670    | ND       | 84-74-2   | Di-n-butylphthalate        |   | 670     | ND        |        |          |      |          |   |
| 120-82-1 | 1,2,4-Trichlorobenzene       | 670    | ND       | 206-44-0  | Fluoranthene               |   | 670     | ND        |        |          |      |          | T |
| 91-20-3  | Naphthalene                  | 670    | ND       | 129-00-0  | Pyrene                     |   | 670     | ND        |        |          |      |          | T |
| 106-47-8 | 4-Chloroaniline              | 670    | ND       | 85-68-7   | Butylbenzylphthalate       |   | 670     | ND        |        |          |      |          |   |
| 87-68-3  | Hexachlorobutadiene          | 670    | ND       | 92-87-5   | Benzidine                  |   | 670     | ND        |        |          |      |          |   |
| 59-50-7  | 4-Chloro-3-methylphenol      | 670    | ND       | 91-94-1   | 3,3-Dichlorobenzidine      |   | 670     | ND        |        |          |      |          |   |
| 91-57-6  | 2-Methylnaphthalene          | 670    | ND       | 56-55-3   | Benzo(a)anthracene         |   | 670     | ND        |        |          |      |          | T |
| 77-47-4  | Hexachlorocyclopentadiene    | 670    | ND       | 218-01-9  | Chrysene                   |   | 670     | ND        |        |          |      |          | T |
| 88-06-2  | 2,4,6-Trichlorophenol        | 670    | ND       | 117-81-7  | bis(2-Ethylhexyl)phthalate |   | 670     | ND        |        |          |      |          |   |
| 95-95-4  | 2,4,5-Trichlorophenol        | 3400   | ND       | 117-84-0  | Di-n-octylphthalate        |   | 670     | ND        |        |          |      |          |   |
| 91-58-7  | 2-Chloronaphthalene          | 670    | ND       | 205-99-2  | Benzo(b)fluoranthene       |   | 670     | ND        |        |          |      |          | T |
| 88-74-4  | 2-Nitroaniline               | 3400   | ND       | 207-08-9  | Benzo(k)fluoranthene       |   | 670     | ND        |        |          |      |          | T |
| 131-11-3 | Dimethylphthalate            | 670    | ND       | 50-32-8   | Benzo(a)pyrene             |   | 670     | ND        |        |          |      |          | T |
| 208-96-8 | Acenaphthylene               | 670    | ND       | 193-39-5  | Indeno(1,2,3-cd)pyrene     |   | 670     | ND        |        |          |      |          | T |
| 606-20-2 | 2,6-Dinitrotoluene           | 670    | ND       | 53-70-3   | Dibenz(a,h)anthracene      |   | 670     | ND        |        |          |      |          |   |
| 52-75-9  | N-Nitrosodimethylamine       | 670    | ND       | 191-24-2  | Benzo(g,h,i)perylene       |   | 670     | ND        |        |          |      |          | T |

Project #: 903201

ug/Kg on a dry weight basis

ND: Denotes less than stated quantitative detection limit

Q: Qualifier: B: Denotes present in blank

T: Denotes trace level detected

## CHEMALYSIS INCORPORATED

PESTICIDE/PCB ANALYSIS RESULTS  
EPA Method 8080

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|              |                              |                 |                |
|--------------|------------------------------|-----------------|----------------|
| Client:      | Baltimore Corps of Engineers | Lab ID:         | 9004323        |
| Client ID:   | Comp. B (#2,3)               | Date Sampled:   | 09/16/90       |
| Location:    | Alexandria Waterfront        | Time Sampled:   | 10:15-10:40 AM |
| Water Depth: | 20-24 Ft.                    | Moisture(%):    | 51             |
| Matrix:      | Sediment Core                | Date Extracted: | 09/19/90       |
| Units:       | ug/Kg (dry weight)           | Date Analyzed:  | 09/20/90       |

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| CAS Number | Parameter           | Quantitative Detection Limit | Concentration Detected |
|------------|---------------------|------------------------------|------------------------|
| 319-84-6   | alpha-BHC           | 2.0                          | ND                     |
| 319-85-7   | beta-BHC            | 2.0                          | ND                     |
| 318-86-8   | delta-BHC           | 2.0                          | ND                     |
| 58-89-9    | gamma-BHC (Lindane) | 2.0                          | ND                     |
| 76-64-8    | Heptachlor          | 2.0                          | ND                     |
| 309-00-2   | Aldrin              | 2.0                          | ND                     |
| 1026-57-3  | Heptachlor epoxide  | 2.0                          | ND                     |
| 959-98-8   | Endosulfan I        | 2.0                          | ND                     |
| 60-57-1    | Dieldrin            | 2.0                          | ND                     |
| 72-55-9    | 4,4'-DDE            | 2.0                          | ND                     |
| 72-20-8    | Endrin              | 2.0                          | ND                     |
| 7421-93-4  | Endrin aldehyde     | 2.0                          | ND                     |
| 33213-65-9 | Endosulfan II       | 2.0                          | ND                     |
| 72-54-8    | 4,4'-DDD            | 2.0                          | ND                     |
| 1031-07-8  | Endosulfan sulfate  | 2.0                          | ND                     |
| 50-29-3    | 4,4'-DDT            | 2.0                          | ND                     |
| 57-74-9    | Technical Chlordane | 16                           | ND                     |
| 8001-35-2  | Toxaphene           | 102                          | ND                     |
| 12674-11-2 | PCB-1016            | 20                           | ND                     |
| 11104-28-2 | PCB-1221            | 20                           | ND                     |
| 11141-16-5 | PCB-1232            | 20                           | ND                     |
| 53469-21-9 | PCB-1242            | 20                           | ND                     |
| 12672-29-6 | PCB-1248            | 20                           | ND                     |
| 11097-69-1 | PCB-1254            | 20                           | ND                     |
| 11096-82-5 | PCB-1260            | 20                           | ND                     |

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Project #: 903201

ND: Denotes less than stated quantitative detection limit

## CHEMALYSIS INCORPORATED

## CHEMICAL ANALYSIS RESULTS

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|              |                              |               |                    |
|--------------|------------------------------|---------------|--------------------|
| Client:      | Baltimore Corps of Engineers | Lab ID:       | 9004323            |
| Client ID:   | Comp. B (#2,3)               | Date Sampled: | 09/16/90           |
| Location:    | Alexandria Waterfront        | Time Sampled: | 10:15-10:40 AM     |
| Water Depth: | 20-24 Ft.                    | Moisture(%):  | 51                 |
| Matrix:      | Sediment Core                | Units:        | mg/kg (dry weight) |

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| CAS Number | Parameter               | EPA Method Number | Quantitative Detection Limit | Concentration Detected |
|------------|-------------------------|-------------------|------------------------------|------------------------|
| 7440-36-0  | Antimony                | 7041              | 2.0                          | ND                     |
| 7440-38-2  | Arsenic                 | 7060              | 1.0                          | 6.8                    |
| 7440-41-7  | Beryllium               | 7090              | 2.0                          | ND                     |
| 7440-43-9  | Cadmium                 | 7130              | 1.0                          | 3.1                    |
| 7440-47-3  | Chromium                | 7190              | 2.0                          | 46.0                   |
| 7440-50-8  | Copper                  | 7210              | 5.1                          | 47.2                   |
| 7440-92-1  | Lead                    | 7420              | 20                           | 57.4                   |
| 7439-97-6  | Mercury                 | 7471              | 0.2                          | 0.5                    |
| 7440-02-0  | Nickel                  | 7520              | 8.2                          | 44.7                   |
| 7882-49-2  | Selenium                | 7740              | 1.0                          | 2.2                    |
| 7440-22-4  | Silver                  | 7760              | 2.0                          | 3.3                    |
| 7440-28-0  | Thallium                | 7841              | 2.0                          | ND                     |
| 7440-66-6  | Zinc                    | 7950              | 4.1                          | 222                    |
|            | Cyanides                | 9010              | 0.2                          | ND                     |
|            | Phenols                 | 9065              | 5.1                          | ND                     |
|            | Chemical Oxygen Demand  | 410.1             |                              |                        |
|            | Oil and Grease          | 413.2/3550        |                              |                        |
|            | Total Kjeldahl Nitrogen | 3-201*            |                              |                        |
|            | Ammonia Nitrogen        | 3-155*            |                              |                        |
|            | Nitrate Nitrogen        | 3-159*            |                              |                        |
|            | Total Phosphorus        | 3-232*            |                              |                        |
|            | Total Organic Carbon    | Walkley-Black     |                              |                        |
|            | Volatile Solids         | 2540G             |                              |                        |

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Project #: 903201

..J: Denotes less than stated quantitative detection limit

\*: Russell H. Plumb, May 1981

## CHENALYSIS INCORPORATED

## EP TOX ANALYSIS RESULTS

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|              |                              |               |                |
|--------------|------------------------------|---------------|----------------|
| Client:      | Baltimore Corps of Engineers | Lab ID:       | 9004323        |
| Client ID:   | Comp. B (#2,3)               | Date Sampled: | 09/16/90       |
| Location:    | Alexandria Waterfront        | Time Sampled: | 10:15-10:40 AM |
| Water Depth: | 20-24 Ft.                    | Units:        | mg/l           |
| Matrix:      | Leachate                     |               |                |

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| CAS Number | Parameter           | EPA           | Quantitative    |                        | RCRA          |
|------------|---------------------|---------------|-----------------|------------------------|---------------|
|            |                     | Method Number | Detection Limit | Concentration Detected | Ep Tox Limit* |
| 72-20-8    | Endrin              | 608           | 0.00005         | ND                     | 0.02          |
| 58-89-9    | gamma-BHC (Lindane) | 608           | 0.00005         | ND                     | 0.4           |
| 72-43-5    | Methoxychlor        | 608           | 0.00025         | ND                     | 10.0          |
| 8001-35-2  | Toxaphene           | 608           | 0.0025          | ND                     | 0.5           |
| 96-75-7    | 2,4-D               | 615           | 0.0025          | ND                     | 10.0          |
| 93-72-1    | 2,4,5-TP (Silvex)   | 615           | 0.0025          | ND                     | 1.0           |
| 7440-38-2  | Arsenic             | 206.2         | 0.005           | ND                     | 5.0           |
| 7440-39-3  | Barium              | 208.1         | 0.50            | 3.05                   | 100.0         |
| 7440-43-9  | Cadmium             | 213.1         | 0.005           | ND                     | 1.0           |
| 7440-47-3  | Chromium            | 218.1         | 0.010           | 0.011                  | 5.0           |
| 7440-92-1  | Lead                | 239.1         | 0.10            | ND                     | 5.0           |
| 7639-97-6  | Mercury             | 245.1         | 0.0002          | 0.0002                 | 0.2           |
| 7882-49-2  | Selenium            | 270.2         | 0.005           | ND                     | 1.0           |
| 7440-22-4  | Silver              | 272.1         | 0.010           | ND                     | 5.0           |

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Project #: 903201

ND: Denotes less than stated quantitative detection limit

\*: Taken from the Federal Register, March 29, 1990, Toxicity Characteristics Revisions

## CHEMALYSIS INCORPORATED

VOLATILE ORGANIC ANALYSIS RESULTS  
EPA Method 8240

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|              |                              |                |          |
|--------------|------------------------------|----------------|----------|
| Client:      | Baltimore Corps of Engineers | Lab ID:        | 9004324  |
| Client ID:   | Composite C (#4,6)           | Date Sampled:  | 09/16/90 |
| Location:    | Alexandria Waterfront        | Time Sampled:  | 8-9AM    |
| Water Depth: | 24 Ft                        | Moisture(%):   | 56       |
| Matrix:      | Sediment Core                | Date Analyzed: | 09/18/90 |

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| CAS Number | Parameter                  | Quantitative Detection |                                  |
|------------|----------------------------|------------------------|----------------------------------|
|            |                            | Limit, ug/Kg           | Concentration<br>Detected, ug/Kg |
| 74-87-3    | Chloromethane              | 450                    | ND                               |
| 74-83-9    | Bromomethane               | 450                    | ND                               |
| 75-01-4    | Vinyl Chloride             | 450                    | ND                               |
| 75-00-3    | Chloroethane               | 450                    | ND                               |
| 75-09-2    | Methylene Chloride         | 230                    | ND                               |
| 67-64-1    | Acetone                    | 450                    | ND                               |
| 75-15-0    | Carbon Disulfide           | 230                    | ND                               |
| 75-69-4    | Trichlorofluoromethane     | 450                    | ND                               |
| 75-35-6    | 1,1-Dichloroethene         | 230                    | ND                               |
| 75-34-3    | 1,1-Dichloroethane         | 230                    | ND                               |
| 540-59-0   | 1,2-Dichloroethene (total) | 230                    | ND                               |
| 67-66-3    | Chloroform                 | 230                    | ND                               |
| 107-06-2   | 1,2-Dichloroethane         | 230                    | ND                               |
| 78-93-3    | 2-Butanone                 | 450                    | ND                               |
| 71-55-6    | 1,1,1-Trichloroethane      | 230                    | ND                               |
| 56-23-5    | Carbon Tetrachloride       | 230                    | ND                               |
| 108-05-4   | Vinyl Acetate              | 450                    | ND                               |
| 75-27-4    | Bromodichloromethane       | 230                    | ND                               |
| 78-87-5    | 1,2-Dichloropropane        | 230                    | ND                               |
| 10061-02-6 | trans-1,3-Dichloropropene  | 230                    | ND                               |
| 79-01-6    | Trichloroethene            | 230                    | ND                               |
| 124-48-1   | Dibromochloromethane       | 230                    | ND                               |
| 79-00-5    | 1,1,2-Trichloroethane      | 230                    | ND                               |
| 71-43-2    | Benzene                    | 230                    | ND                               |
| 10061-01-5 | cis-1,3-Dichloropropene    | 230                    | ND                               |
| 110-75-8   | 2-Chloropethylvinyl ether  | 450                    | ND                               |
| 75-25-2    | Bromoform                  | 230                    | ND                               |
| 591-78-6   | 2-Hexanone                 | 450                    | ND                               |
| 108-10-1   | 4-Methyl-2-pentanone       | 450                    | ND                               |
| 127-18-4   | Tetrachloroethene          | 230                    | ND                               |
| 79-34-5    | 1,1,2,2-Tetrachloroethane  | 230                    | ND                               |
| 108-88-3   | Toluene                    | 230                    | ND                               |
| 108-90-7   | Chlorobenzene              | 230                    | ND                               |
| 100-41-4   | Ethylbenzene               | 230                    | ND                               |
| 100-42-5   | Styrene                    | 230                    | ND                               |
| 1330-20-7  | Total Xylenes              | 230                    | ND                               |

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Project #: 903201 ug/Kg on Dry Weight Basis

ND: Denotes less than stated quantitative detection limit

Q: Qualifier: B: Denotes present in blank

T: Denotes trace level detected

## CHEMALYSIS INCORPORATED

SEMIVOLATILE ANALYSIS RESULTS  
EPA Method 8270

|            |                              |                 |          |
|------------|------------------------------|-----------------|----------|
| Client:    | Baltimore Corps of Engineers | Lab ID:         | 9004324  |
| Client ID: | Composite C (#4,6)           | Date Sampled:   | 09/16/90 |
| Location:  | Alexandria Waterfront        | Time Sampled:   | 8-9AM    |
| Depth:     | Water - 24 Ft                | Moisture (%):   | 56       |
| Matrix:    | Sediment Core                | Date Extracted: | 09/18/90 |
| Units:     | ug/Kg                        | Date Analyzed:  | 09/19/90 |

| CAS No.  | Parameter                   | Quant. | Conc.    | D.L.      | Detected                   | Q | CAS No. | Parameter | Quant. | Conc.    |   |
|----------|-----------------------------|--------|----------|-----------|----------------------------|---|---------|-----------|--------|----------|---|
|          |                             | D.L.   | Detected |           |                            |   |         |           | D.L.   | Detected | Q |
| 108-95-2 | Phenol                      | 750    | ND       | 122-66-7  | 1,2-Diphenylhydrazine      |   | 750     | ND        |        |          |   |
| 111-44-4 | bis(2-Chloroethyl)ether     | 750    | ND       | 99-09-2   | 3-Nitroaniline             |   | 3800    | ND        |        |          |   |
| 95-57-8  | 2-Chlorophenol              | 750    | ND       | 83-32-9   | Acenaphthene               |   | 750     | ND        |        |          |   |
| 541-73-1 | 1,3-Dichlorobenzene         | 750    | ND       | 51-28-5   | 2,4-Dinitrophenol          |   | 3800    | ND        |        |          |   |
| 106-46-7 | 1,4-Dichlorobenzene         | 750    | ND       | 100-02-7  | 4-Nitrophenol              |   | 3800    | ND        |        |          |   |
| 100-51-6 | Benzyl alcohol              | 750    | ND       | 132-64-9  | Dibenzofuran               |   | 750     | ND        |        |          |   |
| 95-50-1  | 1,2-Dichlorobenzene         | 750    | ND       | 121-14-2  | 2,4-Dinitrotoluene         |   | 750     | ND        |        |          |   |
| 95-48-7  | 2-Methylphenol              | 750    | ND       | 84-66-2   | Diethylphthalate           |   | 750     | ND        |        |          |   |
| 108-60-1 | bis(2-Chloroisopropyl)ether | 750    | ND       | 7005-72-3 | 4-Chlorophenyl-phenylether |   | 750     | ND        |        |          |   |
| 106-44-5 | 4-Methylphenol              | 750    | ND       | 86-73-7   | Fluorene                   |   | 750     | ND        |        |          |   |
| 621-64-7 | N-Nitoso-di-n-dipropylamine | 750    | ND       | 100-01-6  | 4-Nitroaniline             |   | 3800    | ND        |        |          |   |
| 67-72-1  | Hexachloroethane            | 750    | ND       | 534-52-1  | 4,6-Dinitro-2-methylphenol |   | 3800    | ND        |        |          |   |
| 98-95-3  | Nitrobenzene                | 750    | ND       | 86-30-6   | N-Nitrosodiphenylamine     |   | 750     | ND        |        |          |   |
| 78-59-1  | Isophorone                  | 750    | ND       | 101-55-3  | 4-Bromophenyl-phenylether  |   | 750     | ND        |        |          |   |
| 88-75-5  | 2-Nitrophenol               | 750    | ND       | 118-74-1  | Hexachlorobenzene          |   | 750     | ND        |        |          |   |
| 105-67-9 | 2,4-Dimethylphenol          | 750    | ND       | 87-86-5   | Pentachlorophenol          |   | 3800    | ND        |        |          |   |
| 65-85-0  | Benzoic acid                | 3800   | ND       | 85-01-8   | Phenanthrene               |   | 750     | ND        |        |          | T |
| 111-91-1 | bis(2-Chloroethoxy)methane  | 750    | ND       | 120-12-7  | Anthracene                 |   | 750     | ND        |        |          |   |
| 120-83-2 | 2,4-Dichlorophenol          | 750    | ND       | 84-74-2   | Di-n-butylphthalate        |   | 750     | ND        |        |          |   |
| 120-82-1 | 1,2,4-Trichlorobenzene      | 750    | ND       | 206-44-0  | Fluoranthene               |   | 750     | ND        |        |          | T |
| 91-20-3  | Naphthalene                 | 750    | ND       | 129-00-0  | Pyrene                     |   | 750     | ND        |        |          | T |
| 106-47-8 | 4-Chloroaniline             | 750    | ND       | 85-68-7   | Butylbenzylphthalate       |   | 750     | ND        |        |          |   |
| 87-68-3  | Hexachlorobutadiene         | 750    | ND       | 92-87-5   | Benzidine                  |   | 750     | ND        |        |          |   |
| 59-50-7  | 4-Chloro-3-methylphenol     | 750    | ND       | 91-94-1   | 3,3-Dichlorobenzidine      |   | 750     | ND        |        |          |   |
| 91-57-6  | 2-Methylnaphthalene         | 750    | ND       | 56-55-3   | Benzo(a)anthracene         |   | 750     | ND        |        |          |   |
| 77-47-4  | Hexachlorocyclopentadiene   | 750    | ND       | 218-01-9  | Chrysene                   |   | 750     | ND        |        |          |   |
| 88-06-2  | 2,4,6-Trichlorophenol       | 750    | ND       | 117-81-7  | bis(2-Ethylhexyl)phthalate |   | 750     | ND        |        |          |   |
| 95-95-4  | 2,4,5-Trichlorophenol       | 3800   | ND       | 117-84-0  | Di-n-octylphthalate        |   | 750     | ND        |        |          |   |
| 91-58-7  | 2-Chloronaphthalene         | 750    | ND       | 205-99-2  | Benzo(b)fluoranthene       |   | 750     | ND        |        |          |   |
| 88-74-4  | 2-Nitroaniline              | 3800   | ND       | 207-08-9  | Benzo(k)fluoranthene       |   | 750     | ND        |        |          |   |
| 131-11-3 | Dimethylphthalate           | 750    | ND       | 50-32-8   | Benzo(a)pyrene             |   | 750     | ND        |        |          |   |
| 208-96-8 | Acenaphthylene              | 750    | ND       | 193-39-5  | Indeno(1,2,3-cd)pyrene     |   | 750     | ND        |        |          |   |
| 606-20-2 | 2,6-Dinitrotoluene          | 750    | ND       | 53-70-3   | Dibenz(a,h)anthracene      |   | 750     | ND        |        |          |   |
| 62-75-9  | N-Nitrosodimethylamine      | 750    | ND       | 191-24-2  | Benzo(g,h,i)perylene       |   | 750     | ND        |        |          |   |

Project #: 903201

ug/Kg on a dry weight basis

ND: Denotes less than stated quantitative detection limit

Q: Qualifier: B: Denotes present in blank

T: Denotes trace level detected

## CHEMALYSIS INCORPORATED

PESTICIDE/PCB ANALYSIS RESULTS  
EPA Method 8080

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|              |                              |                 |              |
|--------------|------------------------------|-----------------|--------------|
| Client:      | Baltimore Corps of Engineers | Lab ID:         | 9004326      |
| Client ID:   | Comp. C (#4,6)               | Date Sampled:   | 09/16/90     |
| Location:    | Alexandria Waterfront        | Time Sampled:   | 8:34-9:16 AM |
| Water Depth: | 24 Ft.                       | Moisture(%):    | 56           |
| Matrix:      | Sediment Core                | Date Extracted: | 09/19/90     |
| Units:       | ug/Kg (dry weight)           | Date Analyzed:  | 09/20/90     |

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| CAS Number | Parameter           | Quantitative       | Concentration<br>Detected |
|------------|---------------------|--------------------|---------------------------|
|            |                     | Detection<br>Limit |                           |
| 319-84-6   | alpha-BHC           | 2.3                | ND                        |
| 319-85-7   | beta-BHC            | 2.3                | ND                        |
| 318-86-8   | delta-BHC           | 2.3                | ND                        |
| 58-89-9    | gamma-BHC (Lindane) | 2.3                | ND                        |
| 76-44-8    | Heptachlor          | 2.3                | ND                        |
| 309-00-2   | Aldrin              | 2.3                | ND                        |
| 1024-57-3  | Heptachlor epoxide  | 2.3                | ND                        |
| 959-98-8   | Endosulfan I        | 2.3                | ND                        |
| 60-57-1    | Dieldrin            | 2.3                | ND                        |
| 72-55-9    | 4,4'-DDE            | 2.3                | ND                        |
| 72-20-8    | Endrin              | 2.3                | ND                        |
| 7421-93-4  | Endrin aldehyde     | 2.3                | ND                        |
| 33213-65-9 | Endosulfan II       | 2.3                | ND                        |
| 72-54-8    | 4,4'-DDD            | 2.3                | ND                        |
| 1031-07-8  | Endosulfan sulfate  | 2.3                | ND                        |
| 50-29-3    | 4,4'-DDT            | 2.3                | ND                        |
| 57-74-9    | Technical Chlordane | 18                 | ND                        |
| 8001-35-2  | Toxaphene           | 114                | ND                        |
| 12674-11-2 | PCB-1016            | 23                 | ND                        |
| 11104-28-2 | PCB-1221            | 23                 | ND                        |
| 11141-16-5 | PCB-1232            | 23                 | ND                        |
| 53469-21-9 | PCB-1242            | 23                 | ND                        |
| 12672-29-6 | PCB-1248            | 23                 | ND                        |
| 11097-69-1 | PCB-1254            | 23                 | ND                        |
| 11096-82-5 | PCB-1260            | 23                 | ND                        |

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Project #: 903201

ND: Denotes less than stated quantitative detection limit

## CHEMALYSIS INCORPORATED

## CHEMICAL ANALYSIS RESULTS

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|              |                              |               |                    |
|--------------|------------------------------|---------------|--------------------|
| Client:      | Baltimore Corps of Engineers | Lab ID:       | 9004324            |
| Client ID:   | Comp. C (#4,6)               | Date Sampled: | 09/16/90           |
| Location:    | Alexandria Waterfront        | Time Sampled: | 8:34-9:16 AM       |
| Water Depth: | 24 Ft.                       | Moisture(%):  | 56                 |
| Matrix:      | Sediment Core                | Units:        | mg/kg (dry weight) |

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| CAS Number | Parameter               | EPA Method    | Quantitative Detection Limit | Concentration Detected |
|------------|-------------------------|---------------|------------------------------|------------------------|
| 7440-36-0  | Antimony                | 7041          | 2.3                          | ND                     |
| 7440-38-2  | Arsenic                 | 7060          | 1.1                          | 7.9                    |
| 7440-41-7  | Beryllium               | 7090          | 2.3                          | ND                     |
| 7440-43-9  | Cadmium                 | 7130          | 1.1                          | 4.0                    |
| 7440-47-3  | Chromium                | 7190          | 2.3                          | 43.2                   |
| 7440-50-8  | Copper                  | 7210          | 5.7                          | 43.4                   |
| 7440-92-1  | Lead                    | 7420          | 23                           | 49.0                   |
| 7439-97-6  | Mercury                 | 7471          | 0.2                          | 0.3                    |
| 7440-02-0  | Nickel                  | 7520          | 9.1                          | 49.9                   |
| 7882-49-2  | Selenium                | 7740          | 1.1                          | 2.4                    |
| 7440-22-4  | Silver                  | 7760          | 2.3                          | 4.5                    |
| 7440-28-0  | Thallium                | 7841          | 2.3                          | ND                     |
| 7440-66-6  | Zinc                    | 7950          | 4.5                          | 198                    |
|            | Cyanides                | 9010          | 0.2                          | ND                     |
|            | Phenols                 | 9065          | 5.7                          | ND                     |
|            | Chemical Oxygen Demand  | 410.1         | 1.8 %                        | 62 %                   |
|            | Oil and Grease          | 413.2/3550    | 2.3                          | ND                     |
|            | Total Kjeldahl Nitrogen | 3-201*        | 2.3                          | 386                    |
|            | Ammonia Nitrogen        | 3-155*        | 2.3                          | 395                    |
|            | Nitrate Nitrogen        | 3-159*        | 2.3                          | ND                     |
|            | Total Phosphorus        | 3-232*        | 4.5                          | 932                    |
|            | Total Organic Carbon    | Walkley-Black | 1 %                          | 4 %                    |
|            | Volatile Solids         | 2540G         | 1 %                          | 2.2 %                  |

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Project #: 903201

ND: Denotes less than stated quantitative detection limit

\*: Russell H. Plumb, May 1981

## CHEMALYSIS INCORPORATED

## EP TOX ANALYSIS RESULTS

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|              |                              |               |              |
|--------------|------------------------------|---------------|--------------|
| Client:      | Baltimore Corps of Engineers | Lab ID:       | 9004324      |
| Client ID:   | Comp. C (#4,6)               | Date Sampled: | 09/16/90     |
| Location:    | Alexandria Waterfront        | Time Sampled: | 8:34-9:16 AM |
| Water Depth: | 24 Ft.                       | Units:        | mg/l         |
| Matrix:      | Leachate                     |               |              |

---

| CAS Number | Parameter           | EPA           | Quantitative    |                        | RCRA          |
|------------|---------------------|---------------|-----------------|------------------------|---------------|
|            |                     | Method Number | Detection Limit | Concentration Detected | Ep Tox Limit* |
| 72-20-8    | Endrin              | 608           | 0.00005         | ND                     | 0.02          |
| 58-89-9    | gamma-BHC (Lindane) | 608           | 0.00005         | ND                     | 0.4           |
| 72-63-5    | Methoxychlor        | 608           | 0.00025         | ND                     | 10.0          |
| 8001-35-2  | Toxaphene           | 608           | 0.0025          | ND                     | 0.5           |
| 94-73-7    | 2,4-D               | 615           | 0.0025          | ND                     | 10.0          |
| 93-72-1    | 2,4,5-TP (Silvex)   | 615           | 0.0025          | ND                     | 1.0           |
| 7440-38-2  | Arsenic             | 206.2         | 0.005           | ND                     | 5.0           |
| 7440-39-3  | Barium              | 208.1         | 0.05            | 1.98                   | 100.0         |
| 7440-43-9  | Cadmium             | 213.1         | 0.005           | ND                     | 1.0           |
| 7440-47-3  | Chromium            | 218.1         | 0.010           | 0.180                  | 5.0           |
| 7440-92-1  | Lead                | 239.1         | 0.10            | ND                     | 5.0           |
| 7439-97-6  | Mercury             | 245.1         | 0.0002          | 0.0002                 | 0.2           |
| 7882-49-2  | Selenium            | 270.2         | 0.005           | ND                     | 1.0           |
| 7440-22-4  | Silver              | 272.1         | 0.010           | ND                     | 5.0           |

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Project #: 903201

ND: Denotes less than stated quantitative detection limit

\*: Taken from the Federal Register, March 29, 1990, Toxicity Characteristics Revisions

## CHEMALYSIS INCORPORATED

VOLATILE ORGANIC ANALYSIS RESULTS  
EPA Method 8240

|              |                              |                |          |
|--------------|------------------------------|----------------|----------|
| Client:      | Baltimore Corps of Engineers | Lab ID:        | 9004325  |
| Client ID:   | Composite D (#10,11)         | Date Sampled:  | 09/16/90 |
| Location:    | Hunting Creek Shoal          | Time Sampled:  | 2-3 PM   |
| Water Depth: | 19-22 Ft                     | Moisture(%):   | 48       |
| Matrix:      | Sediment Core                | Date Analyzed: | 09/18/90 |

| CAS Number | Parameter                  | Quantitative              | Concentration<br>Detected, ug/Kg | Q |
|------------|----------------------------|---------------------------|----------------------------------|---|
|            |                            | Detection<br>Limit, ug/Kg |                                  |   |
| 74-87-3    | Chloromethane              | 380                       | ND                               |   |
| 74-83-9    | Bromomethane               | 380                       | ND                               |   |
| 75-01-4    | Vinyl Chloride             | 380                       | ND                               |   |
| 75-00-3    | Chloroethane               | 380                       | ND                               |   |
| 75-09-2    | Methylene Chloride         | 190                       | ND                               |   |
| 67-64-1    | Acetone                    | 380                       | ND                               |   |
| 75-15-0    | Carbon Disulfide           | 190                       | ND                               |   |
| 75-69-4    | Trichlorofluoromethane     | 380                       | ND                               |   |
| 75-35-4    | 1,1-Dichloroethene         | 190                       | ND                               |   |
| 75-34-3    | 1,1-Dichloroethane         | 190                       | ND                               |   |
| 540-59-0   | 1,2-Dichloroethene (total) | 190                       | ND                               |   |
| 67-66-3    | Chloroform                 | 190                       | ND                               |   |
| 107-06-2   | 1,2-Dichloroethane         | 190                       | ND                               |   |
| 78-93-3    | 2-Butanone                 | 380                       | ND                               |   |
| 71-55-6    | 1,1,1-Trichloroethane      | 190                       | ND                               |   |
| 56-23-5    | Carbon Tetrachloride       | 190                       | ND                               |   |
| 108-05-4   | Vinyl Acetate              | 380                       | ND                               |   |
| 75-27-4    | Bromodichloromethane       | 190                       | ND                               |   |
| 78-87-5    | 1,2-Dichloropropene        | 190                       | ND                               |   |
| 10061-02-6 | trans-1,3-Dichloropropene  | 190                       | ND                               |   |
| 79-01-6    | Trichloroethene            | 190                       | ND                               |   |
| 124-48-1   | Dibromochloromethane       | 190                       | ND                               |   |
| 79-00-5    | 1,1,2-Trichloroethane      | 190                       | ND                               |   |
| 71-43-2    | Benzene                    | 190                       | ND                               |   |
| 10061-01-5 | cis-1,3-Dichloropropene    | 190                       | ND                               |   |
| 110-75-8   | 2-Chloroethylvinyl ether   | 380                       | ND                               |   |
| 75-25-2    | Bromoform                  | 190                       | ND                               |   |
| 591-78-6   | 2-Hexanone                 | 380                       | ND                               |   |
| 108-10-1   | 4-Methyl-2-pentanone       | 380                       | ND                               |   |
| 127-18-4   | Tetrachloroethene          | 190                       | ND                               |   |
| 79-34-5    | 1,1,2,2-Tetrachloroethane  | 190                       | ND                               |   |
| 108-88-3   | Toluene                    | 190                       | ND                               |   |
| 108-90-7   | Chlorobenzene              | 190                       | ND                               |   |
| 100-41-4   | Ethylbenzene               | 190                       | ND                               |   |
| 100-42-5   | Styrene                    | 190                       | ND                               |   |
| 1330-20-7  | Total Xylenes              | 190                       | ND                               |   |

Project #: 903201 ug/Kg on Dry Weight Basis

ND: Denotes less than stated quantitative detection limit

Q: Qualifier: B: Denotes present in blank

T: Denotes trace level detected

## CHEMALYSIS INCORPORATED

SEMICVOLATILE ANALYSIS RESULTS  
EPA Method 8270

|            |                              |                 |          |
|------------|------------------------------|-----------------|----------|
| Client:    | Baltimore Corps of Engineers | Lab ID:         | 9004325  |
| Client ID: | Composite D (#10,11)         | Date Sampled:   | 09/16/90 |
| Location:  | Hunting Creek Shoal          | Time Sampled:   | 2-3PM    |
| Depth:     | Water - 19 to 22 Ft          | Moisture (%):   | 48       |
| Matrix:    | Sediment Core                | Date Extracted: | 09/18/90 |
| Units:     | ug/Kg                        | Date Analyzed:  | 09/19/90 |

| CAS No.  | Parameter                   | Quant. | Conc.    | D.L.      | Detected                   | Q | CAS No. | Parameter | Quant. | Conc.    |   |
|----------|-----------------------------|--------|----------|-----------|----------------------------|---|---------|-----------|--------|----------|---|
|          |                             | D.L.   | Detected |           |                            |   |         |           | D.L.   | Detected | Q |
| 108-95-2 | Phenol                      | 630    | ND       | 122-66-7  | 1,2-Diphenylhydrazine      |   | 630     |           | ND     |          |   |
| 111-44-4 | bis(2-Chloroethyl)ether     | 630    | NJ       | 99-09-2   | 3-Nitroaniline             |   | 3200    |           | ND     |          |   |
| 95-57-8  | 2-Chlorophenol              | 630    | ND       | 93-32-9   | Acenaphthene               |   | 630     |           | ND     |          |   |
| 541-73-1 | 1,3-Dichlorobenzene         | 630    | ND       | 51-28-5   | 2,4-Dinitrophenol          |   | 3200    |           | ND     |          |   |
| 106-46-7 | 1,4-Dichlorobenzene         | 630    | ND       | 100-02-7  | 4-Nitrophenol              |   | 3200    |           | ND     |          |   |
| 100-51-6 | Benzyl alcohol              | 630    | ND       | 132-64-9  | Dibenzofuran               |   | 630     |           | ND     |          |   |
| 95-50-1  | 1,2-Dichlorobenzene         | 630    | ND       | 121-14-2  | 2,4-Dinitrotoluene         |   | 630     |           | ND     |          |   |
| 95-48-7  | 2-Methylphenol              | 630    | ND       | 84-66-2   | Diethylphthalate           |   | 630     |           | ND     |          |   |
| 108-60-1 | bis(2-Chloroisopropyl)ether | 630    | ND       | 7005-72-3 | 4-Chlorophenyl-phenylether |   | 630     |           | ND     |          |   |
| 106-44-5 | 4-Methylphenol              | 630    | ND       | 86-73-7   | Fluorene                   |   | 630     |           | ND     |          |   |
| 621-64-7 | N-Nitoso-di-n-dipropylamine | 630    | ND       | 100-01-6  | 4-Nitroaniline             |   | 3200    |           | ND     |          |   |
| 67-72-1  | Hexachloroethane            | 630    | ND       | 534-52-1  | 4,6-Dinitro-2-methylphenol |   | 3200    |           | ND     |          |   |
| 98-95-3  | Nitrobenzene                | 630    | ND       | 86-30-6   | N-Nitrosodiphenylamine     |   | 630     |           | ND     |          |   |
| 78-59-1  | Isophorone                  | 630    | ND       | 101-55-3  | 4-Bromophenyl-phenylether  |   | 630     |           | ND     |          |   |
| 88-75-5  | 2-Nitrophenol               | 630    | ND       | 118-74-1  | Hexachlorobenzene          |   | 630     |           | ND     |          |   |
| 105-67-9 | 2,4-Dimethylphenol          | 630    | ND       | 87-86-5   | Pentachlorophenol          |   | 3200    |           | ND     |          |   |
| 65-85-0  | Benzoic acid                | 3200   | ND       | 85-01-8   | Phenanthrene               |   | 630     |           | ND     |          |   |
| 111-91-1 | bis(2-Chloroethoxy)methane  | 630    | ND       | 120-12-7  | Anthracene                 |   | 630     |           | ND     |          |   |
| 120-83-2 | 2,4-Dichlorophenol          | 630    | ND       | 84-74-2   | Di-n-butylphthalate        |   | 630     |           | ND     |          |   |
| 120-82-1 | 1,2,4-Trichlorobenzene      | 630    | ND       | 206-44-0  | Fluoranthene               |   | 630     |           | ND     |          |   |
| 91-20-3  | Naphthalene                 | 630    | ND       | 129-00-0  | Pyrene                     |   | 630     |           | ND     |          |   |
| 106-47-8 | 4-Chloroaniline             | 630    | ND       | 85-68-7   | Butylbenzylphthalate       |   | 630     |           | ND     |          |   |
| 87-68-3  | Hexachlorobutadiene         | 630    | ND       | 92-87-5   | Benzidine                  |   | 630     |           | ND     |          |   |
| 59-50-7  | 4-Chloro-3-methylphenol     | 630    | ND       | 91-94-1   | 3,3-Dichlorobenzidine      |   | 630     |           | ND     |          |   |
| 91-57-6  | 2-Methylnaphthalene         | 630    | ND       | 56-55-3   | Benzo(a)anthracene         |   | 630     |           | ND     |          |   |
| 77-47-4  | Hexachlorocyclopentadiene   | 630    | ND       | 218-01-9  | Chrysene                   |   | 630     |           | ND     |          |   |
| 88-06-2  | 2,4,6-Trichlorophenol       | 630    | ND       | 117-81-7  | bis(2-Ethylhexyl)phthalate |   | 630     |           | ND     |          |   |
| 95-95-4  | 2,4,5-Trichlorophenol       | 3200   | ND       | 117-84-0  | Di-n-octylphthalate        |   | 630     |           | ND     |          |   |
| 91-58-7  | 2-Chloronaphthalene         | 630    | ND       | 205-99-2  | Benzo(b)fluoranthene       |   | 630     |           | ND     |          |   |
| 88-74-4  | 2-Nitroaniline              | 3200   | ND       | 207-08-9  | Benzo(k)fluoranthene       |   | 630     |           | ND     |          |   |
| 131-11-3 | Dimethylphthalate           | 630    | ND       | 50-32-8   | Benzo(a)pyrene             |   | 630     |           | ND     |          |   |
| 208-96-8 | Acenaphthylene              | 630    | ND       | 193-39-5  | Indeno(1,2,3-cd)pyrene     |   | 630     |           | ND     |          |   |
| 606-20-2 | 2,6-Dinitrotoluene          | 630    | ND       | 53-70-3   | Dibenz(a,h)anthracene      |   | 630     |           | ND     |          |   |
| 62-75-9  | N-Nitrosodimethylamine      | 630    | ND       | 191-24-2  | Benzo(g,h,i)perylene       |   | 630     |           | ND     |          |   |

Project #: 903201

ug/Kg on a dry weight basis

ND: Denotes less than stated quantitative detection limit

Q: Qualifier: B: Denotes present in blank

T: Denotes trace level detected

## CHEMALYSIS INCORPORATED

PESTICIDE/PCB ANALYSIS RESULTS  
EPA Method 8080

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|              |                              |                 |              |
|--------------|------------------------------|-----------------|--------------|
| Client:      | Baltimore Corps of Engineers | Lab ID:         | 9004325      |
| Client ID:   | Comp. D (#10,11)             | Date Sampled:   | 09/16/90     |
| Location:    | Hunting Creek School         | Time Sampled:   | 2:30-3:00 PM |
| Water Depth: | 19-22 Ft.                    | Moisture(%):    | 48           |
| Matrix:      | Sediment Core                | Date Extracted: | 09/19/90     |
| Units:       | ug/Kg (dry weight)           | Date Analyzed:  | 09/20/90     |

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| CAS Number | Parameter           | Quantitative Detection Limit | Concentration Detected |
|------------|---------------------|------------------------------|------------------------|
| 319-84-6   | alpha-BHC           | 1.9                          | ND                     |
| 319-85-7   | beta-BHC            | 1.9                          | ND                     |
| 318-86-8   | delta-BHC           | 1.9                          | ND                     |
| 58-89-9    | gamma-BHC (Lindane) | 1.9                          | ND                     |
| 76-64-8    | Heptachlor          | 1.9                          | ND                     |
| 309-00-2   | Aldrin              | 1.9                          | ND                     |
| 1024-57-3  | Heptachlor epoxide  | 1.9                          | ND                     |
| 959-98-8   | Endosulfan I        | 1.9                          | ND                     |
| 60-57-1    | Dieldrin            | 1.9                          | ND                     |
| 72-55-9    | 4,4'-DDT            | 1.9                          | ND                     |
| 72-20-8    | Endrin              | 1.9                          | ND                     |
| 7421-93-4  | Endrin aldehyde     | 1.9                          | ND                     |
| 33213-65-9 | Endosulfan II       | 1.9                          | ND                     |
| 72-54-8    | 4,4'-DDD            | 1.9                          | ND                     |
| 1031-07-8  | Endosulfan sulfate  | 1.9                          | ND                     |
| 50-29-3    | 4,4'-DDT            | 1.9                          | ND                     |
| 57-74-9    | Technical Chlordane | 15                           | ND                     |
| 8001-35-2  | Toxaphene           | 96                           | ND                     |
| 12674-11-2 | PCB-1016            | 19                           | ND                     |
| 11104-28-2 | PCB-1221            | 19                           | ND                     |
| 11141-16-5 | PCB-1232            | 19                           | ND                     |
| 53469-21-9 | PCB-1242            | 19                           | ND                     |
| 12672-29-6 | PCB-1248            | 19                           | ND                     |
| 11097-69-1 | PCB-1254            | 19                           | ND                     |
| 11096-82-5 | PCB-1260            | 19                           | ND                     |

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Project #: 903201

ND: Denotes less than stated quantitative detection limit

## CHENALYSIS INCORPORATED

## CHEMICAL ANALYSIS RESULTS

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|              |                              |               |                    |
|--------------|------------------------------|---------------|--------------------|
| Client:      | Baltimore Corps of Engineers | Lab ID:       | 9004325            |
| Client ID:   | Comp. D (#10,11)             | Date Sampled: | 09/16/90           |
| Location:    | Hunting Creek Shoal          | Time Sampled: | 2:30-3:00 PM       |
| Water Depth: | 19-22 Ft.                    | Moisture(%):  | 48                 |
| Matrix:      | Sediment Core                | Units:        | mg/kg (dry weight) |

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| CAS Number | Parameter               | EPA Method Number | Quantitative Detection Limit | Concentration Detected |
|------------|-------------------------|-------------------|------------------------------|------------------------|
| 7440-36-0  | Antimony                | 7041              | 1.9                          | ND                     |
| 7440-38-2  | Arsenic                 | 7060              | 1.0                          | 5.2                    |
| 7440-41-7  | Beryllium               | 7090              | 1.9                          | ND                     |
| 7440-43-9  | Cadmium                 | 7130              | 1.0                          | 2.7                    |
| 7440-47-3  | Chromium                | 7190              | 1.9                          | 29.9                   |
| 7440-50-8  | Copper                  | 7210              | 4.8                          | 21.7                   |
| 7440-92-1  | Lead                    | 7420              | 19                           | 27.6                   |
| 7439-97-6  | Mercury                 | 7471              | 0.2                          | 0.2                    |
| 7440-02-0  | Nickel                  | 7520              | 7.7                          | 34.5                   |
| 7882-49-2  | Selenium                | 7740              | 1.0                          | 1.5                    |
| 7440-22-4  | Silver                  | 7760              | 1.9                          | 1.8                    |
| 7440-28-0  | Thallium                | 7841              | 1.9                          | ND                     |
| 7440-66-6  | Zinc                    | 7950              | 3.8                          | 115                    |
|            | Cyanides                | 9010              | 0.2                          | ND                     |
|            | Phenols                 | 9065              | 4.8                          | ND                     |
|            | Chemical Oxygen Demand  | 410.1             | 2.1 %                        | 63 %                   |
|            | Oil and Grease          | 413.2/3550        | 1.9                          | ND                     |
|            | Total Kjeldahl Nitrogen | 3-201*            | 1.9                          | 240                    |
|            | Ammonia Nitrogen        | 3-155*            | 1.9                          | 77                     |
|            | Nitrate Nitrogen        | 3-159*            | 1.9                          | ND                     |
|            | Total Phosphorus        | 3-232*            | 3.8                          | 1350                   |
|            | Total Organic Carbon    | Walkley-Black     | 1 %                          | 3 %                    |
|            | Volatile Solids         | 2540G             | 1 %                          | 11.2 %                 |

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Project #: 903201

ND: Denotes less than stated quantitative detection limit

\*: Russell H. Plumb, May 1981

## CHEMALYSIS INCORPORATED

## EP TOX ANALYSIS RESULTS

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|              |                              |               |              |
|--------------|------------------------------|---------------|--------------|
| Client:      | Baltimore Corps of Engineers | Lab ID:       | 9004325      |
| Client ID:   | Comp. D (#10,11)             | Date Sampled: | 09/16/90     |
| Location:    | Hunting Creek Shoal          | Time Sampled: | 2:30-3:00 PM |
| Water Depth: | 19-22 Ft.                    | Units:        | mg/l         |
| Matrix:      | Leachate                     |               |              |

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| CAS Number | Parameter           | EPA Method Number | Quantitative Detection Limit | Concentration Detected | RCRA Ep Tox Limit* |
|------------|---------------------|-------------------|------------------------------|------------------------|--------------------|
| 72-20-8    | Endrin              | 608               | 0.00005                      | ND                     | 0.02               |
| 58-89-9    | gamma-BHC (Lindane) | 608               | 0.00005                      | ND                     | 0.4                |
| 72-43-5    | Methoxychlor        | 608               | 0.00025                      | ND                     | 10.0               |
| 8001-35-2  | Toxaphene           | 608               | 0.0025                       | ND                     | 0.5                |
| 94-75-7    | 2,4-D               | 615               | 0.0025                       | ND                     | 10.0               |
| 93-72-1    | 2,4,5-TP (Silvex)   | 615               | 0.0025                       | ND                     | 1.0                |
| 7440-38-2  | Arsenic             | 206.2             | 0.005                        | ND                     | 5.0                |
| 7440-39-3  | Barium              | 208.1             | 0.05                         | 2.30                   | 100.0              |
| 7440-43-9  | Cadmium             | 213.1             | 0.005                        | ND                     | 1.0                |
| 7440-47-3  | Chromium            | 218.1             | 0.010                        | 0.014                  | 5.0                |
| 7440-92-1  | Lead                | 239.1             | 0.10                         | ND                     | 5.0                |
| 7439-97-6  | Mercury             | 245.1             | 0.0002                       | 0.0002                 | 0.2                |
| 7882-49-2  | Selenium            | 270.2             | 0.005                        | ND                     | 1.0                |
| 7440-22-4  | Silver              | 272.1             | 0.010                        | ND                     | 5.0                |

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Project #: 903201

ND: Denotes less than stated quantitative detection limit

\*: Taken from the Federal Register, March 29, 1990, Toxicity Characteristics Revisions

## CHEMALYSIS INCORPORATED

PESTICIDE/PCB ANALYSIS RESULTS  
EPA Method 8080

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|              |                              |                 |                |
|--------------|------------------------------|-----------------|----------------|
| Client:      | Baltimore Corps of Engineers | Lab ID:         | 9004326        |
| Client ID:   | Comp. E (#7,8,9)             | Date Sampled:   | 09/16/90       |
| Location:    | Oxon Creek                   | Time Sampled:   | 11:05-11:40 AM |
| Water Depth: | 7-8 Ft.                      | Moisture(%):    | 56             |
| Matrix:      | Sediment Core                | Date Extracted: | 09/19/90       |
| Units:       | ug/Kg (dry weight)           | Date Analyzed:  | 09/20/90       |

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| CAS Number | Parameter           | Quantitative Detection Limit | Concentration Detected |
|------------|---------------------|------------------------------|------------------------|
| 319-84-6   | alpha-BHC           |                              |                        |
| 319-85-7   | beta-BHC            |                              |                        |
| 318-86-8   | delta-BHC           |                              |                        |
| 58-89-9    | gamma-BHC (Lindane) |                              |                        |
| 76-44-8    | Heptachlor          |                              |                        |
| 309-00-2   | Aldrin              |                              |                        |
| 1024-57-3  | Heptachlor epoxide  |                              |                        |
| 959-98-8   | Endosulfan I        |                              |                        |
| 60-57-1    | Dieldrin            |                              |                        |
| 72-55-9    | 4,4'-DDE            |                              |                        |
| 72-20-8    | Endrin              |                              |                        |
| 7421-93-4  | Endrin aldehyde     |                              |                        |
| 33213-65-9 | Endosulfan II       |                              |                        |
| 72-54-8    | 4,4'-DDD            |                              |                        |
| 1031-07-8  | Endosulfan sulfate  |                              |                        |
| 50-29-3    | 4,4'-DDT            |                              |                        |
| 57-74-9    | Technical Chlordane | 18                           | ND                     |
| 8001-35-2  | Toxaphene           |                              |                        |
| 12674-11-2 | PCB-1016            |                              |                        |
| 11104-28-2 | PCB-1221            |                              |                        |
| 11141-16-5 | PCB-1232            |                              |                        |
| 53469-21-9 | PCB-1242            |                              |                        |
| 12672-29-6 | PCB-1248            |                              |                        |
| 11097-69-1 | PCB-1254            |                              |                        |
| 11096-82-5 | PCB-1260            |                              |                        |

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Project #: 903201

ND: Denotes less than stated quantitative detection limit

## CHEMALYSIS INCORPORATED

## CHEMICAL ANALYSIS RESULTS

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|              |                              |               |                    |
|--------------|------------------------------|---------------|--------------------|
| Client:      | Baltimore Corps of Engineers | Lab ID:       | 9004326            |
| Client ID:   | Comp. E (#7,8,9)             | Date Sampled: | 09/16/90           |
| Location:    | Oxon Creek                   | Time Sampled: | 11:05-11:40 AM     |
| Water Depth: | 7-8 Ft.                      | Moisture(%):  | 56                 |
| Matrix:      | Sediment Core                | Units:        | mg/kg (dry weight) |

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| CAS Number | Parameter               | EPA Method Number | Quantitative Detection Limit | Concentration Detected |
|------------|-------------------------|-------------------|------------------------------|------------------------|
| 7440-36-0  | Antimony                | 7041              |                              |                        |
| 7440-38-2  | Arsenic                 | 7060              |                              |                        |
| 7440-41-7  | Beryllium               | 7090              |                              |                        |
| 7440-43-9  | Cadmium                 | 7130              | 1.1                          | 5.0                    |
| 7440-47-3  | Chromium                | 7190              | 2.3                          | 65.6                   |
| 7440-50-8  | Copper                  | 7210              | 5.7                          | 56.5                   |
| 7440-92-1  | Lead                    | 7420              |                              |                        |
| 7639-97-6  | Mercury                 | 7471              | 0.2                          | 0.3                    |
| 7440-02-0  | Nickel                  | 7520              |                              |                        |
| 7882-49-2  | Selenium                | 7740              |                              |                        |
| 7440-22-4  | Silver                  | 7760              |                              |                        |
| 7440-28-0  | Thallium                | 7841              |                              |                        |
| 7440-66-6  | Zinc                    | 7950              | 4.5                          | 256                    |
|            | Cyanides                | 9010              | 0.2                          | ND                     |
|            | Phenols                 | 9065              |                              |                        |
|            | Chemical Oxygen Demand  | 410.1             | 2.2 %                        | 69 %                   |
|            | Oil and Grease          | 413.2/3550        | 2.3                          | 428                    |
|            | Total Kjeldahl Nitrogen | 3-201*            | 2.3                          | 477                    |
|            | Ammonia Nitrogen        | 3-155*            |                              |                        |
|            | Nitrate Nitrogen        | 3-159*            |                              |                        |
|            | Total Phosphorus        | 3-232*            | 4.5                          | 2950                   |
|            | Total Organic Carbon    | Walkley-Black     | 1 %                          | 3 %                    |
|            | Volatile Solids         | 2540G             | 1 %                          | 2.7 %                  |

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Project #: 903201

ND: Denotes less than stated quantitative detection limit

\*: Russell H. Plumb, May 1981

## CHEMALYSIS INCORPORATED

VOLATILE ORGANIC ANALYSIS RESULTS  
EPA Method 8240

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|              |                              |                |          |
|--------------|------------------------------|----------------|----------|
| Client:      | Baltimore Corps of Engineers | Lab ID:        | 9004327  |
| Client ID:   | Composite F (#12,13)         | Date Sampled:  | 09/16/90 |
| Location:    | Gunston Cove (Deep Hole)     | Time Sampled:  | 12-1 PM  |
| Water Depth: | 45 Ft                        | Moisture(%):   | 53       |
| Matrix:      | Sediment Grab                | Date Analyzed: | 09/18/90 |

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| CAS Number | Parameter                  | Quantitative           |                               |
|------------|----------------------------|------------------------|-------------------------------|
|            |                            | Detection Limit, ug/Kg | Concentration Detected, ug/Kg |
| 74-87-3    | Chloromethane              | 430                    | ND                            |
| 74-83-9    | Bromomethane               | 430                    | ND                            |
| 75-01-4    | Vinyl Chloride             | 430                    | ND                            |
| 75-00-3    | Chloroethane               | 430                    | ND                            |
| 75-09-2    | Methylene Chloride         | 210                    | ND                            |
| 67-64-1    | Acetone                    | 430                    | ND                            |
| 75-15-0    | Carbon Disulfide           | 210                    | ND                            |
| 75-69-4    | Trichlorofluoromethane     | 430                    | ND                            |
| 75-35-4    | 1,1-Dichloroethene         | 210                    | ND                            |
| 75-34-3    | 1,1-Dichloroethane         | 210                    | ND                            |
| 540-59-0   | 1,2-Dichloroethene (total) | 210                    | ND                            |
| 67-66-3    | Chloroform                 | 210                    | ND                            |
| 107-06-2   | 1,2-Dichloroethane         | 210                    | ND                            |
| 78-93-3    | 2-Butanone                 | 430                    | ND                            |
| 71-55-6    | 1,1,1-Trichloroethane      | 210                    | ND                            |
| 56-23-5    | Carbon Tetrachloride       | 210                    | ND                            |
| 108-05-4   | Vinyl Acetate              | 430                    | ND                            |
| 75-27-4    | Bromodichloromethane       | 210                    | ND                            |
| 78-87-5    | 1,2-Dichloropropane        | 210                    | ND                            |
| 10061-02-6 | trans-1,3-Dichloropropene  | 210                    | ND                            |
| 79-01-6    | Trichloroethene            | 210                    | ND                            |
| 124-48-1   | Dibromochloromethane       | 210                    | ND                            |
| 79-00-5    | 1,1,2-Trichloroethane      | 210                    | ND                            |
| 71-43-2    | Benzene                    | 210                    | ND                            |
| 10061-01-5 | cis-1,3-Dichloropropene    | 210                    | ND                            |
| 110-75-8   | 2-Chloroethylvinyl ether   | 430                    | ND                            |
| 75-25-2    | Bromoform                  | 210                    | ND                            |
| 591-78-6   | 2-Hexanone                 | 430                    | ND                            |
| 108-10-1   | 4-Methyl-2-pentanone       | 430                    | ND                            |
| 127-18-4   | Tetrachloroethene          | 210                    | ND                            |
| 79-34-5    | 1,1,2,2-Tetrachloroethane  | 210                    | ND                            |
| 108-88-3   | Toluene                    | 210                    | ND                            |
| 108-90-7   | Chlorobenzene              | 210                    | ND                            |
| 100-41-4   | Ethylbenzene               | 210                    | ND                            |
| 100-42-5   | Styrene                    | 210                    | ND                            |
| 1330-20-7  | Total Xylenes              | 210                    | ND                            |

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Project #: 903201 ug/Kg on Dry Weight Basis

ND: Denotes less than stated quantitative detection limit

Q: Qualifier: B: Denotes present in blank

T: Denotes trace level detected

## CHEMALYSIS INCORPORATED

SEMIVOLATILE ANALYSIS RESULTS  
EPA Method 8270

|            |                              |                 |          |
|------------|------------------------------|-----------------|----------|
| Client:    | Baltimore Corps of Engineers | Lab ID:         | 9004327  |
| Client ID: | Composite F (#12,13)         | Date Sampled:   | 09/16/90 |
| Location:  | Gunston Cove (Deep Hole)     | Time Sampled:   | 12-1 PM  |
| Depth:     | Water - 45 Ft                | Moisture (%):   | 53       |
| Matrix:    | Sediment Grab                | Date Extracted: | 09/18/90 |
| Units:     | ug/Kg                        | Date Analyzed:  | 09/19/90 |

| CAS No.  | Parameter                    | Quant. | Conc.    | D.L.      | Detected                   | Q | CAS No. | Parameter | Quant.   | Conc. |
|----------|------------------------------|--------|----------|-----------|----------------------------|---|---------|-----------|----------|-------|
|          |                              | D.L.   | Detected |           |                            |   |         | D.L.      | Detected | Q     |
| 108-95-2 | Phenol                       | 700    | ND       | 122-66-7  | 1,2-Diphenylhydrazine      |   | 700     | ND        |          |       |
| 111-44-4 | bis(2-Chloroethyl)ether      | 700    | ND       | 99-09-2   | 3-Nitroaniline             |   | 3500    | ND        |          |       |
| 95-57-8  | 2-Chlorophenol               | 700    | ND       | 83-32-9   | Acenaphthene               |   | 700     | ND        |          |       |
| 541-73-1 | 1,3-Dichlorobenzene          | 700    | ND       | 51-28-5   | 2,4-Dinitrophenol          |   | 3500    | ND        |          |       |
| 106-46-7 | 1,4-Dichlorobenzene          | 700    | ND       | 100-02-7  | 4-Nitrophenol              |   | 3500    | ND        |          |       |
| 100-51-6 | Benzyl alcohol               | 700    | ND       | 132-64-9  | Dibenzofuran               |   | 700     | ND        |          |       |
| 95-50-1  | 1,2-Dichlorobenzene          | 700    | ND       | 121-14-2  | 2,4-Dinitrotoluene         |   | 700     | ND        |          |       |
| 95-48-7  | 2-Methylphenol               | 700    | ND       | 84-66-2   | Diethylphthalate           |   | 700     | ND        |          |       |
| 108-60-1 | bis(2-Chloroisopropyl)ether  | 700    | ND       | 7005-72-3 | 4-Chlorophenyl-phenylether |   | 700     | ND        |          |       |
| 106-44-5 | 4-Methylphenol               | 700    | ND       | 86-73-7   | Fluorene                   |   | 700     | ND        |          |       |
| 621-64-7 | N-Nitroso-di-n-dipropylamine | 700    | ND       | 100-01-6  | 4-Nitroaniline             |   | 3500    | ND        |          |       |
| 67-72-1  | Hexachloroethane             | 700    | ND       | 534-52-1  | 4,6-Dinitro-2-methylphenol |   | 3500    | ND        |          |       |
| 98-95-3  | Nitrobenzene                 | 700    | ND       | 86-30-6   | N-Nitrosodiphenylamine     |   | 700     | ND        |          |       |
| 78-59-1  | Isophorone                   | 700    | ND       | 101-55-3  | 4-Bromophenyl-phenylether  |   | 700     | ND        |          |       |
| 88-75-5  | 2-Nitrophenol                | 700    | ND       | 118-74-1  | Hexachlorobenzene          |   | 700     | ND        |          |       |
| 105-67-9 | 2,4-Dimethylphenol           | 700    | ND       | 87-86-5   | Pentachlorophenol          |   | 3500    | ND        |          |       |
| 65-85-0  | Benzoic acid                 | 3500   | ND       | 85-01-8   | Phenanthrene               |   | 700     | ND        |          | T     |
| 111-91-1 | bis(2-Chloroethoxy)methane   | 700    | ND       | 120-12-7  | Anthracene                 |   | 700     | ND        |          |       |
| 120-83-2 | 2,4-Dichlorophenol           | 700    | ND       | 84-74-2   | Di-n-butylphthalate        |   | 700     | ND        |          |       |
| 120-82-1 | 1,2,4-Trichlorobenzene       | 700    | ND       | 206-44-0  | Fluoranthene               |   | 700     | ND        |          | T     |
| 91-20-3  | Naphthalene                  | 700    | ND       | 129-00-0  | Pyrene                     |   | 700     | ND        |          | T     |
| 106-47-8 | 4-Chloroaniline              | 700    | ND       | 85-68-7   | Butylbenzylphthalate       |   | 700     | ND        |          |       |
| 87-68-3  | Hexachlorobutadiene          | 700    | ND       | 92-87-5   | Benzidine                  |   | 700     | ND        |          |       |
| 59-50-7  | 4-Chloro-3-methylphenol      | 700    | ND       | 91-94-1   | 3,3-Dichlorobenzidine      |   | 700     | ND        |          |       |
| 91-57-6  | 2-Methylnaphthalene          | 700    | ND       | 56-55-3   | Benzo(a)anthracene         |   | 700     | ND        |          |       |
| 77-47-4  | Hexachlorocyclopentadiene    | 700    | ND       | 218-01-9  | Chrysene                   |   | 700     | ND        |          |       |
| 88-06-2  | 2,4,6-Trichlorophenol        | 700    | ND       | 117-81-7  | bis(2-Ethylhexyl)phthalate |   | 700     | ND        |          |       |
| 95-95-4  | 2,4,5-Trichlorophenol        | 3500   | ND       | 117-84-0  | Di-n-octylphthalate        |   | 700     | ND        |          |       |
| 91-58-7  | 2-Chloronaphthalene          | 700    | ND       | 205-99-2  | Benzo(b)fluoranthene       |   | 700     | ND        |          | T     |
| 88-74-4  | 2-Nitroaniline               | 3500   | ND       | 207-08-9  | Benzo(k)fluoranthene       |   | 700     | ND        |          | T     |
| 131-11-3 | Dimethylphthalate            | 700    | ND       | 50-32-8   | Benzo(a)pyrene             |   | 700     | ND        |          |       |
| 208-96-8 | Acenaphthylene               | 700    | ND       | 193-39-5  | Indeno(1,2,3-cd)pyrene     |   | 700     | ND        |          |       |
| 606-20-2 | 2,6-Dinitrotoluene           | 700    | ND       | 53-70-3   | Dibenz(a,h)anthracene      |   | 700     | ND        |          |       |
| 62-75-9  | N-Nitrosodimethylamine       | 700    | ND       | 191-24-2  | Benzo(g,h,i)perylene       |   | 700     | ND        |          |       |

Project #: 903201

ug/Kg on a dry weight basis

ND: Denotes less than stated quantitative detection limit

Q: Qualifier: B: Denotes present in blank

T: Denotes trace level detected

## CHEMALYSIS INCORPORATED

PESTICIDE/PCB ANALYSIS RESULTS  
EPA Method 8080

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|              |                              |                 |               |
|--------------|------------------------------|-----------------|---------------|
| Client:      | Baltimore Corps of Engineers | Lab ID:         | 9004327       |
| Client ID:   | Comp. F (#12,13)             | Date Sampled:   | 09/16/90      |
| Location:    | Gunston Cove                 | Time Sampled:   | 12:30-1:00 PM |
| Water Depth: | 45-46 Ft.                    | Moisture(%):    | 53            |
| Matrix:      | Sediment Core                | Date Extracted: | 09/19/90      |
| Units:       | ug/Kg (dry weight)           | Date Analyzed:  | 09/20/90      |

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| CAS Number | Parameter           | Quantitative    |                        |
|------------|---------------------|-----------------|------------------------|
|            |                     | Detection Limit | Concentration Detected |
| 319-84-6   | alpha-BHC           | 2.1             | ND                     |
| 319-85-7   | beta-BHC            | 2.1             | ND                     |
| 318-86-8   | delta-BHC           | 2.1             | ND                     |
| 58-89-9    | gamma-BHC (Lindane) | 2.1             | ND                     |
| 76-44-8    | Heptachlor          | 2.1             | ND                     |
| 309-00-2   | Aldrin              | 2.1             | ND                     |
| 1024-57-3  | Heptachlor epoxide  | 2.1             | ND                     |
| 959-98-8   | Endosulfan I        | 2.1             | ND                     |
| 60-57-1    | Dieldrin            | 2.1             | ND                     |
| 72-55-9    | 4,4'-DDE            | 2.1             | 3.0                    |
| 72-20-8    | Endrin              | 2.1             | ND                     |
| 7421-93-4  | Endrin aldehyde     | 2.1             | ND                     |
| 33213-65-9 | Endosulfan II       | 2.1             | ND                     |
| 72-54-8    | 4,4'-DDD            | 2.1             | ND                     |
| 1031-07-8  | Endosulfan sulfate  | 2.1             | ND                     |
| 50-29-3    | 4,4'-DDT            | 2.1             | ND                     |
| 57-74-9    | Technical Chlordane | 17              | ND                     |
| 8001-35-2  | Toxaphene           | 106             | ND                     |
| 12674-11-2 | PCB-1016            | 21              | ND                     |
| 11104-28-2 | PCB-1221            | 21              | ND                     |
| 11141-16-5 | PCB-1232            | 21              | ND                     |
| 53469-21-9 | PCB-1242            | 21              | ND                     |
| 12672-29-6 | PCB-1248            | 21              | ND                     |
| 11097-69-1 | PCB-1254            | 21              | ND                     |
| 11096-82-5 | PCB-1260            | 21              | ND                     |

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Project #: 903201

ND: Denotes less than stated quantitative detection limit

## CHEMALYSIS INCORPORATED

## CHEMICAL ANALYSIS RESULTS

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|              |                              |               |                    |
|--------------|------------------------------|---------------|--------------------|
| Client:      | Baltimore Corps of Engineers | Lab ID:       | 9004327            |
| Client ID:   | Comp. F (#12,13)             | Date Sampled: | 09/16/90           |
| Location:    | Gunston Cove                 | Time Sampled: | 12:30-1:00 PM      |
| Water Depth: | 45-46 Ft.                    | Moisture(%):  | 53                 |
| Matrix:      | Sediment Core                | Units:        | mg/kg (dry weight) |

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| CAS Number | Parameter               | EPA Method Number | Quantitative Detection Limit | Concentration Detected |
|------------|-------------------------|-------------------|------------------------------|------------------------|
| 7440-36-0  | Antimony                | 7041              | 2.1                          | ND                     |
| 7440-38-2  | Arsenic                 | 7060              | 1.1                          | 9.1                    |
| 7440-41-7  | Beryllium               | 7090              | 2.1                          | ND                     |
| 7440-43-9  | Cadmium                 | 7130              | 1.1                          | 4.5                    |
| 7440-47-3  | Chromium                | 7190              | 2.1                          | 41.5                   |
| 7440-50-8  | Copper                  | 7210              | 5.3                          | 41.9                   |
| 7440-92-1  | Lead                    | 7420              | 21                           | 59.0                   |
| 7439-97-6  | Mercury                 | 7471              | 0.2                          | 0.8                    |
| 7440-02-0  | Nickel                  | 7520              | 8.5                          | 53.1                   |
| 7882-49-2  | Selenium                | 7740              | 1.1                          | 1.5                    |
| 7440-22-4  | Silver                  | 7760              | 2.1                          | 3.6                    |
| 7440-28-0  | Thallium                | 7841              | 2.1                          | ND                     |
| 7440-66-6  | Zinc                    | 7950              | 4.3                          | 204                    |
|            | Cyanides                | 9010              | 0.2                          | ND                     |
|            | Phenols                 | 9065              | 5.3                          | ND                     |
|            | Chemical Oxygen Demand  | 410.1             | 1.9 %                        | 77 %                   |
|            | Oil and Grease          | 413.2/3550        | 2.1                          | ND                     |
|            | Total Kjeldahl Nitrogen | 3-201*            | 2.1                          | 426                    |
|            | Ammonia Nitrogen        | 3-155*            | 2.1                          | 415                    |
|            | Nitrate Nitrogen        | 3-159*            | 2.1                          | 5.8                    |
|            | Total Phosphorus        | 3-232*            | 4.3                          | 1660                   |
|            | Total Organic Carbon    | Walkley-Black     | 1 %                          | 3 %                    |
|            | Volatile Solids         | 2540G             | 1 %                          | 2.6 %                  |

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Project #: 90320\*

ND: Denotes less than stated quantitative detection limit

\*: Russell H. Plumb, May 1981

GP Work Order # 9904190

SAMPLE ANALYSIS REPORT

Prepared For:

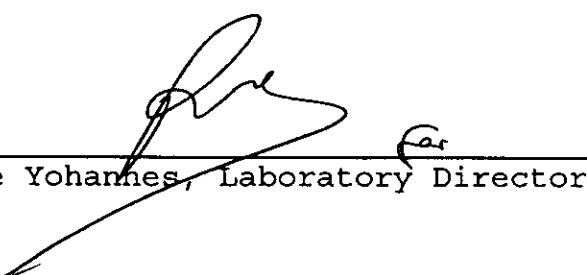
ENGINEERING & ENVIRONMENT, INC  
PEMBROKE ONE BUILDING  
VIRGINIA BEACH, VA 23462

99-030 MATTAWOMAN CREEK

Prepared By:

GPL Laboratories, LLLP  
202 Perry Parkway  
Gaithersburg, MD 20877

May 14, 1999

  
Yemane Yohannes, Laboratory Director

ect: 99-030 MATTAWOMAN CREEK

**GPL LABORATORIES, LLLP  
ANALYTICAL RESULTS**

Page 1

roject: 99-030 MATTAWOMAN CREEK

NGINEERING & ENVIRONMENT, INC

EMBROKE ONE BUILDING

IRGINIA BEACH, VA 23462

tten: MICHAEL CREE

GPL LABORATORIES, LLLP  
202 Perry Parkway  
Gaithersburg, MD 20877

Atten: Client Services  
Phone: (301) 926-6802

Certified by: \_\_\_\_\_

P.I.

**SAMPLE IDENTIFICATION**

| <u>GP ID</u> | <u>Client ID</u> |
|--------------|------------------|
| 9904190-01A  | MWB-3-CORE       |
| 9904190-02A  | MWB-2-CORE       |
| 9904190-03A  | MWB-1-CORE       |

GPL LABORATORIES, LLLP  
ORGANIC ANALYSIS RESULTS

P ID: 9904190-01A  
 Client ID: MWB-3-CORE  
 Collected: 04/14/99  
 Dilution: 1

Matrix: SEDIMENT  
 Method: sw-846 8082  
 Units: UG/KG

Analyst: ALE  
 Analyzed: 05/14/99  
 Prepared: 04/28/99

## GC TARGET COMPOUNDS

| Parameter                        | Result | Rep.Lim. | Qualifier |
|----------------------------------|--------|----------|-----------|
| 2,2',3,5'-Tetrachlorobiphenyl    | BQL    | 4.0      |           |
| 2,2',5,5'-Tetrachlorobiphenyl    | BQL    | 4.0      |           |
| 2,2',5-Trichlorobiphenyl         | BQL    | 4.0      |           |
| 2,2'3,4,4'5-Hexachlorobiphenyl   | BQL    | 4.0      |           |
| 2,2'3,4,5,5'-Pentachlorobiphenyl | BQL    | 4.0      |           |
| 2,2'3,4,5,5'Hexachlorobiphenyl   | BQL    | 4.0      |           |
| 2,2'3,5,5'6-Hexachlorobiphenyl   | BQL    | 4.0      |           |
| 2,2'4,4'5,5'Hexachlorobiphenyl   | BQL    | 4.0      |           |
| 2,2'4,5,5'-Pentachlorobiphenyl   | BQL    | 4.0      |           |
| 2,3',4,4'-Tetrachlorobiphenyl    | BQL    | 4.0      |           |
| 2,3,3'4'6-Pentachlorobiphenyl    | BQL    | 4.0      |           |
| 2,3-Dichlorobiphenyl             | BQL    | 4.0      |           |
| 2,4',5-Trichlorobiphenyl         | BQL    | 4.0      |           |
| 2-Chlorobiphenyl                 | BQL    | 4.0      |           |
| 22'33'44'5-Heptachlorobiphenyl   | BQL    | 4.0      |           |
| 22'33'44'55'6-Nonachlorobiphenyl | BQL    | 4.0      |           |
| 22'34'55'6-Heptachlorobiphenyl   | BQL    | 4.0      |           |
| 22'344'5'6-Heptachlorobiphenyl   | BQL    | 4.0      |           |
| 2'344'55'-Heptachlorobiphenyl    | BQL    | 4.0      |           |

**GPL LABORATORIES, LLLP**  
**ORGANIC ANALYSIS RESULTS**

GP ID: 9904190-02A  
 Client ID: MWB-2-CORE  
 Collected: 04/15/99  
 Dilution: 1

Matrix: SEDIMENT  
 Method: SW-846 8082  
 Units: UG/KG

Analyst: ALE  
 Analyzed: 05/25/99  
 Prepared: 04/28/99

GC TARGET COMPOUNDS

| <u>Parameter</u>                  | <u>Result</u> | <u>Rep.Lim.</u> | <u>Qualifier</u> |
|-----------------------------------|---------------|-----------------|------------------|
| 2,2',3,5'-Tetrachlorobiphenyl     | BQL           | 3.3             |                  |
| 2,2',5,5'-Tetrachlorobiphenyl     | BQL           | 3.3             |                  |
| 2,2',5-Trichlorobiphenyl          | BQL           | 3.3             |                  |
| 2,2',3,4,4',5-Hexachlorobiphenyl  | BQL           | 3.3             |                  |
| 2,2',3,4,5,5'-Pentachlorobiphenyl | 2.8           | 3.3             | J                |
| 2,2',3,4,5,5'-Hexachlorobiphenyl  | BQL           | 3.3             |                  |
| 2,2',3,5,5',6-Hexachlorobiphenyl  | BQL           | 3.3             |                  |
| 2,2',4,4',5,5'-Hexachlorobiphenyl | 1.1           | 3.3             | J                |
| 2,2',4,5,5'-Pentachlorobiphenyl   | BQL           | 3.3             |                  |
| 2,3',4,4'-Tetrachlorobiphenyl     | BQL           | 3.3             |                  |
| 2,3,3',4',6-Pentachlorobiphenyl   | BQL           | 3.3             |                  |
| 2,3-Dichlorobiphenyl              | BQL           | 3.3             |                  |
| 2,4',5-Trichlorobiphenyl          | BQL           | 3.3             |                  |
| 2-Chlorobiphenyl                  | BQL           | 3.3             |                  |
| 22'33'44'5-Heptachlorobiphenyl    | BQL           | 3.3             |                  |
| 22'33'44'55'6-Nonachlorobiphenyl  | BQL           | 3.3             |                  |
| 22'34'55'6-Heptachlorobiphenyl    | BQL           | 3.3             |                  |
| 22'344'5'6-Heptachlorobiphenyl    | BQL           | 3.3             |                  |
| 22'344'55'-Heptachlorobiphenyl    | 0.91          | 3.3             | J                |

GPL LABORATORIES, LLLP  
ORGANIC ANALYSIS RESULTS

ID: 9904190-03A  
 Client ID: MWB-1-CORE  
 Collected: 04/16/99  
 Dilution: 1

Matrix: SEDIMENT  
 Method: sw-846 8082  
 Units: UG/KG

Analyst: ALE  
 Analyzed: 05/25/99  
 Prepared: 04/28/99

## GC TARGET COMPOUNDS

| Parameter                             | Result | Rep.Lim. | Qualifier |
|---------------------------------------|--------|----------|-----------|
| 2,2',3,5'-Tetrachlorobiphenyl         | BQL    | 3.9      |           |
| 2,2',5,5'-Tetrachlorobiphenyl         | BQL    | 3.9      |           |
| 2,2',5-Trichlorobiphenyl              | BQL    | 3.9      |           |
| 2,2',3,4,4'-Hexachlorobiphenyl        | BQL    | 3.9      |           |
| 2,2',3,4,5'-Pentachlorobiphenyl       | 9.4    | 3.9      |           |
| 2,2',3,4,5,5'-Hexachlorobiphenyl      | BQL    | 3.9      |           |
| 2,2',3,5,5'-Hexachlorobiphenyl        | BQL    | 3.9      |           |
| 2,2',4,4',5,5'-Hexachlorobiphenyl     | 3.8    | 3.9      | J         |
| 2,2',4,5,5'-Pentachlorobiphenyl       | BQL    | 3.9      |           |
| 2,3',4,4'-Tetrachlorobiphenyl         | BQL    | 3.9      |           |
| 2,3,3',4',6-Pentachlorobiphenyl       | 2.0    | 3.9      | J         |
| 2,3-Dichlorobiphenyl                  | BQL    | 3.9      |           |
| 2,4',5-Trichlorobiphenyl              | 2.9    | 3.9      | J         |
| 2-Chlorobiphenyl                      | BQL    | 3.9      |           |
| 22',33',44',5'-Heptachlorobiphenyl    | 1.6    | 3.9      | J         |
| 22',33',44',55',6'-Nonachlorobiphenyl | BQL    | 3.9      |           |
| 22',34',55',6'-Heptachlorobiphenyl    | 1.8    | 3.9      | J         |
| 22',344',5',6'-Heptachlorobiphenyl    | BQL    | 3.9      |           |
| ?',344',55',-Heptachlorobiphenyl      | 2.6    | 3.9      | J         |

GPL LABORATORIES, LLLP  
METALS ANALYSIS RESULTS

GP ID: 9904190-01

Client ID: MWB-3-CORE

Matrix: SEDIMENT  
Collected: 04/14/99

| <u>Parameter</u> | <u>Method</u> | <u>Result</u> | <u>Rep.Lim.</u> | <u>Units</u> | <u>Dil.</u> | <u>Prepared</u> | <u>Analyzed By</u> |
|------------------|---------------|---------------|-----------------|--------------|-------------|-----------------|--------------------|
| Mercury          | SW846 7471    | 0.27          | 0.07            | MG/KG        | 1           | 05/05/99        | 05/07/99 LCM       |
| Arsenic          | SW846 6010    | 7.4           | 2.2             | MG/KG        | 2           | 05/05/99        | 05/07/99 DDH       |
| Cadmium          | SW846 6010    | BQL           | 1.3             | MG/KG        | 2           | 05/05/99        | 05/07/99 DDH       |
| Chromium         | SW846 6010    | 34.4          | 2.2             | MG/KG        | 2           | 05/05/99        | 05/07/99 DDH       |
| Copper           | SW846 6010    | 40.8          | 2.2             | MG/KG        | 2           | 05/05/99        | 05/07/99 DDH       |
| Lead             | SW846 6010    | 40.7          | 1.3             | MG/KG        | 2           | 05/05/99        | 05/07/99 DDH       |
| Zinc             | SW846 6010    | 197           | 2.2             | MG/KG        | 2           | 05/05/99        | 05/07/99 DDH       |

GP ID: 9904190-02

Client ID: MWB-2-CORE

Matrix: SEDIMENT  
Collected: 04/15/99

| <u>Parameter</u> | <u>Method</u> | <u>Result</u> | <u>Rep.Lim.</u> | <u>Units</u> | <u>Dil.</u> | <u>Prepared</u> | <u>Analyzed By</u> |
|------------------|---------------|---------------|-----------------|--------------|-------------|-----------------|--------------------|
| Mercury          | SW846 7471    | 0.22          | 0.06            | MG/KG        | 1           | 05/05/99        | 05/07/99 LCM       |
| Arsenic          | SW846 6010    | 6.4           | 1.5             | MG/KG        | 2           | 05/05/99        | 05/07/99 DDH       |
| Cadmium          | SW846 6010    | BQL           | 0.89            | MG/KG        | 2           | 05/05/99        | 05/07/99 DDH       |
| Chromium         | SW846 6010    | 33.6          | 1.5             | MG/KG        | 2           | 05/05/99        | 05/07/99 DDH       |
| Copper           | SW846 6010    | 36.5          | 1.5             | MG/KG        | 2           | 05/05/99        | 05/07/99 DDH       |
| Lead             | SW846 6010    | 32.2          | 0.89            | MG/KG        | 2           | 05/05/99        | 05/07/99 DDH       |
| Zinc             | SW846 6010    | 145           | 1.5             | MG/KG        | 2           | 05/05/99        | 05/07/99 DDH       |

GP ID: 9904190-03

Client ID: MWB-1-CORE

Matrix: SEDIMENT  
Collected: 04/16/99

| <u>Parameter</u> | <u>Method</u> | <u>Result</u> | <u>Rep.Lim.</u> | <u>Units</u> | <u>Dil.</u> | <u>Prepared</u> | <u>Analyzed By</u> |
|------------------|---------------|---------------|-----------------|--------------|-------------|-----------------|--------------------|
| Mercury          | SW846 7471    | 0.50          | 0.07            | MG/KG        | 1           | 05/05/99        | 05/07/99 LCM       |
| Arsenic          | SW846 6010    | 10.1          | 2.2             | MG/KG        | 2           | 05/05/99        | 05/07/99 DDH       |
| Cadmium          | SW846 6010    | BQL           | 1.3             | MG/KG        | 2           | 05/05/99        | 05/07/99 DDH       |
| Chromium         | SW846 6010    | 47.4          | 2.2             | MG/KG        | 2           | 05/05/99        | 05/07/99 DDH       |
| Copper           | SW846 6010    | 52.5          | 2.2             | MG/KG        | 2           | 05/05/99        | 05/07/99 DDH       |
| Lead             | SW846 6010    | 54.1          | 1.3             | MG/KG        | 2           | 05/05/99        | 05/07/99 DDH       |
| Zinc             | SW846 6010    | 286           | 2.2             | MG/KG        | 2           | 05/05/99        | 05/07/99 DDH       |

t: 99-030 MATTAWOMAN CREEK

**GPL LABORATORIES, LLLP**  
**WET CHEMISTRY ANALYSIS RESULTS**

Page 6

GP ID: 9904190-01

Client ID: MWB-3-CORE

Matrix: SEDIMENT  
Collected: 04/14/99

| Parameter               | Method      | Result | Rep.Lim. | Units | Dil. | Prepared | Analyzed By |
|-------------------------|-------------|--------|----------|-------|------|----------|-------------|
| Phosphorus, Total       | MCAWW 365.2 | BQL    | 7.61     | mg/kg | 1    | 05/12/99 | 05/13/99 SN |
| Percent Solids          | CLP / D2216 | 42.4   |          | %     |      |          | 05/05/99 DT |
| Total Kjeldahl Nitrogen | MCAWW 351.3 | 679    | 31.9     | mg/Kg | 1    | 05/11/99 | 05/11/99 AS |
| Total Organic Carbon    | SW846 9060  | 33600  | 1140     | mg/Kg | 1    |          | 04/30/99 HH |

GP ID: 9904190-02

Client ID: MWB-2-CORE

Matrix: SEDIMENT  
Collected: 04/15/99

| Parameter               | Method      | Result | Rep.Lim. | Units | Dil. | Prepared | Analyzed By |
|-------------------------|-------------|--------|----------|-------|------|----------|-------------|
| Phosphorus, Total       | MCAWW 365.2 | BQL    | 5.73     | mg/kg | 1    | 05/12/99 | 05/13/99 SN |
| Percent Solids          | CLP / D2216 | 51.8   |          | %     |      |          | 05/05/99 DT |
| Total Kjeldahl Nitrogen | MCAWW 351.3 | 1030   | 29.3     | mg/Kg | 1    | 05/11/99 | 05/11/99 AS |
| Organic Carbon          | SW846 9060  | 20900  | 1270     | mg/Kg | 1    |          | 04/30/99 HH |

GP ID: 9904190-03

Client ID: MWB-1-CORE

Matrix: SEDIMENT  
Collected: 04/16/99

| Parameter               | Method      | Result | Rep.Lim. | Units | Dil. | Prepared | Analyzed By |
|-------------------------|-------------|--------|----------|-------|------|----------|-------------|
| Phosphorus, Total       | MCAWW 365.2 | 11.9   | 6.04     | mg/kg | 1    | 05/12/99 | 05/13/99 SN |
| Percent Solids          | CLP / D2216 | 43.8   |          | %     |      |          | 05/05/99 DT |
| Total Kjeldahl Nitrogen | MCAWW 351.3 | 565    | 30.0     | mg/Kg | 1    | 05/11/99 | 05/11/99 AS |
| Total Organic Carbon    | SW846 9060  | 29600  | 1340     | mg/Kg | 1    |          | 04/30/99 HH |

## **ELUTRIATE CALCULATION**

## **Elutriate Calculation of Nitrogen Release**

The elutriate test shows an average of 1.3 mg/l of Nitrogen (N) released from the sediment.

Multiplying 1.3 times the 4 liters of water used to perform the test the result is about 5.2 mg/l of N per liter of sediment. This calculation does not take into account the initial volume of water in the sediment but the elutriate test results account for both the sediment pore water and sediment disassociation of N.

5.2 mg is 0.0052 or  $5.2 \times 10^{-3}$  g/ liter of sediment.

There is about 764 liters of sediment in a cubic yard (cy), therefore there is 764 l/cy times  $5.2 \times 10^{-3}$  g/l or  $3972.8 \times 10^{-3}$  or 3.9728 g/cy.

Since there are 454 g/pound and dividing 3.9728 g/cy by 454 g/lb = 0.0087 lbs/cy

By rounding 0.0087 to 0.01 lbs/cy and multiplying by 564,000 cy you get 5,640 lbs of N being released